The Dissertation Committee for Nicole Jee Wen Certifies that this is the approved version of the following dissertation:

Examining the Ontogeny of Ritual Learning and Social Group Cognition

Committee:

Cristine H. Legare, Supervisor

Art B. Markman

David M. Buss

Mark Nielsen

Examining the Ontogeny of Ritual Learning and Social Group Cognition

by

Nicole Jee Wen

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

August 2018

Dedication

This dissertation is dedicated to my parents, Lonnie and Tony Wen. Thank you for your endless encouragement of all of my aspirations and dreams and for introducing me to the scientific method.

Acknowledgements

Thank you to my undergraduate and graduate advisor, Cristine Legare, for the numerous opportunities you have given me over the past EIGHT years to grow as an individual and as a researcher. Your guidance and encouragement have been invaluable in learning the scientific process. Thank you to Aurora Brinkman and Adam Alcott for all your support in managing the lab and to the honors thesis students I worked with, Michaela Caughy, Stephanie Estrera, and McKenzie Ratcliffe, for your excellent work and commitment to research. To Niki Akhaiveissy, Mahera Badat, Felicia Calo, Carmen Cardenas, Sally Do, Jensen Edwards, Stephanie Gonzalez, Eunice Iyalho, Shama Momin, Keyun Li, Shirley Li, Anisa Nabily, Anh Nguyen, Yasmeen Nofal, Dorothy Pang, Keonnie Parilla, Isabella Prines, Michelle Ross, Hyunji Seo, Allison Tsao, Holly Weir, and Debbie Yeh for assistance with data collection and coding. Thank you also to our Ni-Vanuatu research assistants, Anna, Janet, and Bev.

Thank you to Jennifer Clegg and Rachel Watson-Jones for your tremendous support as friends, lab mates, collaborators, and fieldwork teammates in Vanuatu. To Dolly Rojo, Steven Del Castillo, Annie Holleman, Emily Little, Emily Messer, Sarah Pope, Bruce Rawlings, and Aiyana Willard, thank you for all your support over the many years. Thank you, Katie Cullum, for providing constant support and encouragement, especially when I needed it most. Thank you to Justin Busch for being there through every step of our graduate school careers.

A very special thank you to my grandparents, Josephine and Paul Chew and Helen and Michael Wen, who persevered as immigrants in pursuit of the "American dream". Without your tremendous sacrifices, I would most certainly not be writing these words

today. Thank you to my parents, Lonnie and Tony Wen, and my brother, Michael, for your support in my academic and personal endeavors.

This research was supported by an American Psychological Foundation Elizabeth M. Koppitz Graduate Student Fellowship, the University of Texas at Austin Continuing Graduate Fellowship, and an Economic and Social Research Council grant titled "Ritual, Community, and Conflict" (REF RES-060-25-0085). Thank you to the staff at Extend-A-Care for Kids and the Thinkery in Austin, TX for all of your help and support of this research. This work would not be possible without the participation of the hundreds of families in Austin, TX recruited through the University of Texas at Austin Children's Research Center Database and at the Thinkery. And a final thank you to the families in Tanna, Vanuatu for welcoming our research group into your homes.

Abstract

Examining the Ontogeny of Ritual Learning and Social Group Cognition

Nicole Jee Wen, Ph.D.

The University of Texas at Austin, 2018

Supervisor: Cristine H. Legare

Cultural conventions, such as rituals, are a psychologically understudied yet pervasive feature of human culture. Studying the emergence of rituals in childhood provides insight into the complex dynamics of social group cognition. My dissertation examines how children identify and acquire collective rituals to affiliate with social groups and how evaluations of ritual performance may differ across cultures. Though there is increasing evidence that children acquire ritual through the process of imitation, the underlying assumption is that they engage in this behavior as a means of affiliation with social groups. This assumption has not yet been empirically tested, so this dissertation examined the impact of ritual participation on children's in-group affiliation (Wen, Herrmann, & Legare 2016) and how ritual participation serves to increase affiliation with group members and group leaders, thereby avoiding social exclusion from the group (Wen, Willard, Caughy, & Legare, in prep). The results provide insight into the early-developing preference for in-group members and are consistent with the proposal that rituals facilitate in-group cohesion. Given the propensity of rituals across cultures, this dissertation

examined how evaluations of conformity to a ritual differs cross-culturally (Wen, Clegg, & Legare, 2017). This dissertation proposes that humans are psychologically prepared to engage in ritual as a means of in-group affiliation to prevent the threat of group ostracism. This interdisciplinary and cross-cultural research has been designed to provide an innovative developmental and mixed-methodological approach to studying cultural learning.

Table of Contents

List of Tables

List of Figures

Chapter 1: Background and Aims

Rituals are a universal feature of human culture. They vary in type and scale and may range from religious ceremonies, rites of passage, to rituals surrounding deaths and births. Anthropologists have long proposed that rituals serve the purpose of demonstrating commitment to in-group members, promoting interpersonal bonding, and creating shared beliefs (Humphrey & Laidlaw, 1994; Rappaport, 1999; Whitehouse & Lanman, 2014). While rituals are quite pervasive and have long been studied by anthropologists, they are understudied in psychological research. As humans, we all identify with particular social groups and then as a result, we readily participate in the group's rituals. Young children are well-prepared to learn about these group specific rituals and the particular steps involved in performing the ritual correctly (Legare & Watson-Jones, 2015; Watson-Jones & Legare, 2016).

This dissertation will examine how children's acquisition and participation in collective rituals serves to facilitate group cohesion. First, I will overview how children are able to identify and acquire rituals. Then I will discuss how participating in a ritual increases children's affiliation with group members. And last, I will examine variation in how ritual performance is evaluated across cultures.

RITUAL FUNCTIONS WITHIN SOCIAL GROUPS

To unpack what I mean when I call something a ritual, I will use an example of a ritual done at the University of Texas at Austin's Longhorn football games. There are specific rituals performed at every football game, one of which involves holding your hands to make the "hook 'em horns" symbol (middle and ring finger tucked under your thumb, while your pointer and pinky stick out, resembling a longhorn) every time the university anthem is played. When you hear the anthem being played, you are expected to

stand up and face the center of the field, motion your hands back and forth in a coordinated and synchronous action with the rest of the crowd, to the beat of the anthem. What you'll quickly realize when attending any of these games, is that the whole stadium partakes in this ritual. If I were to stay seated or to fail to make the symbol correctly, I would immediately be identified as an outsider.

Ritual is a socially-constructed category that is defined as a socially stipulated (or prescribed by social norms), casually opaque procedure, which means rituals are uninterpretable from the perspective of physical causality because they lack an intuitive or observable causal connection between the specific action being performed and the desired outcome or effect (Humphrey & Laidlaw, 1994; Legare & Souza, 2012, 2014; Whitehouse & Lanman, 2014). With the football example, there is not a clear causal link between the behavior of synchronized singing and hand waving and the desired outcome of winning a football game. Rituals are also frequently accompanied by conventional language, group coordination, and behavioral synchrony (Bernieri & Rosenthal, 1991; Hove & Risen, 2009; Kirschner & Tomasello, 2010; Marsh, Richardson, & Schmidt, 2009; Wiltermuth & Heath, 2009).

Rituals are cultural artifacts that serve core functions within social groups in order to solve adaptive problems associated with group living by (1) identifying group members, (2) demonstrating group commitment, (3) facilitating cooperation, (4) increasing social cohesion, and (5) promoting high fidelity cultural transmission (Legare & Watson-Jones, 2015; Watson-Jones & Legare, 2016). First, rituals provide reliable markers of group membership, allowing individuals to determine opportunities for cooperation (McElreath, Boyd, & Richerson, 2003). Rituals provide reliable signals that individuals share beliefs and values conveying an individual's commitment to the group, minimizing free-riders (Tooby, Cosmides, & Price, 2006). Rituals are salient evidence of behavioral commitment

to groups (Henrich, 2009). Rituals are useful to the groups who perform them because they function as mechanisms of social cohesion and foster the longevity of social groups (Sosis & Alcorta, 2003; Sosis & Bressler, 2003; Whitehouse & Lanman, 2014). There is also growing evidence that, through signaling group commitment, rituals may contribute to cooperative behavior with in-group members (Ruffle & Sosis, 2007; Soler, 2012; Sosis & Ruffle, 2003). Finally, the social stipulation and causal opacity of rituals make them ideally suited to high fidelity cultural transmission and the inhibition of individual level innovation (Legare & Watson-Jones, 2015; Watson-Jones & Legare, 2016).

HOW DO CHILDREN IDENTIFY AND ACQUIRE RITUALS?

How do humans tackle challenges associated with living in large groups? There is substantial evidence that humans have evolved a variety of psychological adaptations for group living (Caporael, 1997; Kurzban & Neuberg, 2005; Richerson, Boyd, & Henrich, 2003; Tooby et al., 2006). Social group cognition is a developmentally privileged process that occurs very early in human ontogeny (Diesendruck & Markson, 2011; Killen & Rutland, 2011; Legare & Watson-Jones, 2015; Rhodes, 2012; Watson-Jones & Legare, 2016). How do children learn to become competent members of their cultural group? How do they learn and transmit cultural information?

As cultural novices, children must learn skills, beliefs, and practices of their cultural groups (Harris, 2007; Mathew, 2015). They acquire much of their knowledge about the world by imitating others (Richerson & Boyd, 2005; Tomasello, Carpenter, Call, Behne, & Moll, 2005; Tomasello, Kruger, & Ratner, 1993). Causal opacity is pervasive in much of what we do as a cultural species. A vast amount of behavior that we seek to participate in, to learn, and to understand is opaque from the perspective of physical causality and carried out to achieve a social goal. We engage in these practices without much thought

about why they are done from a physical causal perspective and this likely contributes to the high fidelity imitation of actions and their maintenance over time. For example, if a child sees a candle being lit, how does the child know if this candle was lit for a religious ceremony or to illuminate a room? From an early age, children need to be sensitive to cues that elucidate how they should interpret such causally opaque behavior, like lighting a candle. Here, I discuss the cues that children are sensitive to that indicate when a behavior is a ritual action and when it is an instrumental action.

Cues to Ritual and Instrumental Learning

Efficient cultural learning requires flexible imitation (i.e., adjusting imitative fidelity in response to the goal of the behavior). How do children use flexible imitation as a tool for cultural learning? Flexible imitation allows children to acquire both instrumental skills, such as technical skills and tool use, and conventional behavior, such as in-group specific rituals, etiquette, modes of dress, and gestures (Legare, Wen, Herrmann, & Whitehouse, 2015).

A growing body of research has demonstrated that as highly specialized cultural learners, children are well equipped to engage in high-fidelity imitation, a potential indicator of group affiliation through conformity (Clegg & Legare, 2016a, 2016b; Herrmann, Legare, Harris, & Whitehouse, 2013; Legare et al., 2015; Watson-Jones, Legare, Whitehouse, & Clegg, 2014; Watson-Jones, Whitehouse, & Legare, 2016). The same behavior can be interpreted as conventional or instrumental based upon varying contextual cues. How do children determine when behavior is instrumental versus conventional? When cues indicate that a behavior is conventional, children imitate with higher fidelity than when cues indicate that the behavior may have an instrumental goal (See Table 1). They imitate with higher fidelity when start- and end-states of an action sequence are equivalent than when start- and end-states are distinct (Legare et al., 2015;

Nielsen, Kapitány, & Elkins, 2015; Watson-Jones et al., 2014). Children also imitate with higher fidelity when a behavior is preceded by a conventional verbal cue than when behavior is preceded by an instrumental verbal cue (Clegg & Legare, 2016a, 2016b, 2017; Herrmann et al., 2013; Legare et al., 2015). Consensus is also used as a contextual cue to whether they should interpret a behavior ritualistically (consistency in behavior across distinct players) or instrumentally (different behaviors across distinct players). When watching multiple actors perform the same action in unison, children imitate with higher fidelity. (Herrmann et al., 2013; Wilks, Collier-Baker, & Nielsen, 2015). These findings demonstrate that children modulate their imitative behavior based on action sequences themselves and are able to adjudicate when they should copy something faithfully and when there is room for more variability (Legare & Nielsen, 2015).

Contextual Cue	Ritual Learning	Instrumental Learning
Causal Opacity[1-3]	Identical start- and end-states or performance of obviously irrelevant actions	Distinct start- and end-states or performance of only relevant actions
Verbal cues[1, 4-7]	Conventional-orientated language that emphasizes group norms and/or continuity of performance	Outcome-oriented language
Consensus[7, 8]	Consistency in behavior across distinct players	Different behaviors across distinct players
Synchrony[7]	Behavioral coordination in performance across distinct players	Behavioral variation in performance across distinct players

[1]Legare et al., 2015; [2]Nielsen et al., 2015; [3]Watson-Jones et al., 2014; [4]Clegg & Legare; 2016a; [5]Clegg & Legare, 2016b; [6]Clegg & Legare, 2017; [7]Hermann et al., 2013; [8]Wilks et al., 2015

Table 1: Candidate cues to identifying opportunities for ritual versus instrumental learning

Behavioral Outcomes of Ritual versus Instrumental Learning

There are a broad range of psychological outcomes associated with interpreting a behavior ritualistically versus instrumentally. In addition to engaging in higher fidelity imitation, children are more accurate at detecting differences (Legare et al., 2015) and demonstrate more functional fixedness (Clegg & Legare, 2016b) when an action is interpreted ritualistically. Children also transmit ritual behavior with higher fidelity to a peer than instrumental behavior (horizontal transmission) (Clegg & Legare, 2016b). Parents also transmit ritual behavior with higher fidelity to their children than instrumental behavior (vertical transmission) (Clegg & Legare, 2017), see Table 2.

Behavior	Ritual Learning	Instrumental Learning
Imitative fidelity[1-7]	Higher	Lower
Difference detection[1]	More accurate	Less accurate
Functional fixedness[3]	Higher	Lower
Horizontal transmission[3]	Higher fidelity	Lower fidelity
Vertical transmission[2]	Higher fidelity	Lower fidelity

[1]Legare et al., 2015; [2]Clegg & Legare; 2016a; [3]Clegg & Legare, 2016b; [4]Clegg & Legare, 2017; [5]Hermann et al., 2013; [6]Nielsen et al., 2015; [7]Watson-Jones et al., 2014; [8]Wilks et al., 2015

Table 2: Distinct behavioral outcomes associated with instrumental and conventional interpretations of behavior

Children are sensitive to causal opacity, conventional language, consensus, and behavioral synchrony as cues to ritual. And these cues differentially influence children's behavioral outcomes. And importantly, children imitate an action sequence with higher fidelity after receiving these cues, thereby indicating that children are sensitive to cues to convention when transmitting cultural information.

THE ROLE OF CULTURAL CONVENTIONS IN CHILDREN'S SOCIAL GROUP COGNITION

Children acquire ritual through the process of imitation and the underlying assumption here is that they engage in this behavior as a means of affiliation with social groups. However, this hasn't yet been empirically tested. Though there is a large and influential literature on children's reasoning about social groups and the ubiquity of ritualistic behavior, little research to date has examined the transmission of ritualistic behavior between young children or the possibility of unique effects of ritualistic behavior on children's social group cognition. This has yet to be fully investigated, in part because the complexity and historical particularity of the world's ritual traditions make it difficult to identify key features of ritualistic behavior and to establish robust generalizations about causes and effects of these features. Furthermore, rituals have been studied almost exclusively with qualitative designs, limiting strong causal inferences about rituals' impact on human cognition and behavior.

CROSS-CULTURAL EVIDENCE OF RITUAL LEARNING

To understand cultural transmission and variability in the ontogeny of cultural learning, it is crucial for developmental researchers to work in diverse cultural contexts (Legare & Nielsen, 2015; Nielsen, Haun, Kaertner, & Legare, 2017). Childrearing beliefs and practices are highly variable across cultures. Western and non-western indigenous populations vary greatly in child socialization practices (Correa-Chávez & Rogoff, 2009; Keller & Kärtner, 2013; Little, Carver, & Legare, 2016). Though childrearing practices vary across cultures, very few studies have examined children's imitation in non-western populations (see Callaghan et al., 2011; Jensen, 2012 for exceptions). This is essential to understanding what aspects of cognition are species typical and which are open to variation (Henrich, Heine, & Norenzayan, 2010). Children use imitation flexibly to engage in both instrumental and ritual learning in Vanuatu, a Melanesian island nation (Clegg & Legare,

2016a). Children in Vanuatu imitated with higher fidelity when cued with a ritual than an instrumental cue, and children in Vanuatu imitated instrumental tasks with higher fidelity than children in the U.S., potentially reflecting a higher value placed on conformity in Vanuatu than in the U.S. Conformity is a key feature of ritual performance, but do people actually evaluate children who engage in a ritual with high conformity as more competent than children who completed the task with low conformity?

THE PRESENT DISSERTATION

As humans, we all identify with particular social groups and then as a result, readily participate in the group's ritual. Young children are well-prepared to learn about these group specific rituals and the particular steps involved in performing the ritual correctly. Studying the emergence of rituals in childhood provides insight into the complex dynamics of social group cognition. My dissertation aims to examine how children identify and acquire collective rituals to affiliate with social groups, measured through (1) self-report in addition to (2) behaviors towards in- and out-group members, and (3) how evaluations of ritual performance may differ across cultures.

Though there is increasing evidence that children acquire ritual through the process of imitation, the underlying assumption is that they engage in this behavior as a means of affiliation with social groups. This assumption has not yet been empirically tested, so I examined the impact of ritual participation on children's in-group affiliation (Wen, Herrmann, & Legare, 2016) and how ritual participation serves to increase affiliation with group members and group leaders, thereby avoiding social exclusion from the group (Wen, Willard, Caughy, & Legare, in prep). The results provide insight into the early-developing preference for in-group members and are consistent with the proposal that rituals facilitate in-group cohesion. Given the propensity of rituals across cultures, I examined how

evaluations of conformity to a ritual differs cross-culturally (Wen, Clegg, & Legare, 2017). I propose that humans are psychologically prepared to engage in ritual as a means of in-group affiliation to prevent the threat of group ostracism.

Chapter 2

This chapter examined the impact of ritual participation on children's in-group affiliation ($N = 71$, 4-11-year-old children). A novel social group paradigm was used in an afterschool program to test the influence of a ritual versus a control task on an explicit measure of affiliation with in-group versus out-group members. The data support the hypothesis that the experience of participating in a ritual increases in-group affiliation to a greater degree than group activity alone. The results provide insight into the early-developing preference for in-group members and are consistent with the proposal that rituals facilitate in-group cohesion.

Chapter 3

This chapter examined the impact of ritual participation on children's group behavior towards in- and out-group members (N = 49, 4-11-year-olds). A novel social group paradigm was used in an afterschool program to test the influence of a ritual versus control task on children's behaviors toward in- and out-group members, and group leaders. The results demonstrate that engaging in ritual participation increases awareness of out-group members, attention toward in-group leaders, and increased displays of group competence signaling toward in-group leaders. These findings provide insight into how ritual participation serves to increase affiliation with group members and group leaders, thereby avoiding social exclusion from the group. These data are consistent with the proposal that humans are psychologically prepared to engage in ritual as a means of in-group affiliation to prevent the threat of group ostracism.

Chapter 4

This chapter used a novel methodology based on multivocal ethnography to assess the relations between conformity and evaluations of intelligence and good behavior among Western (U.S.) and non-Western (Ni-Vanuatu) children (6-11-year-olds) and adolescents (13-17-year-olds), ($N = 256$). Previous research has shown that U.S. adults were less likely to endorse high conformity children as intelligent than Ni-Vanuatu adults. The current data demonstrate that in contrast to prior studies documenting cultural differences between adults' evaluations of conformity, children and adolescents in the U.S. and Vanuatu have a conformity bias when evaluating peers' intelligence and behavior. Conformity bias for good behavior increases with age. The results have implications for understanding the interplay of conformity bias and trait psychology across cultures and development.

Chapter 2: Rituals Increase Children's Affiliation with In-Group Members[1]

Recent convergent developments in cognitive science (Legare & Souza, 2012; Rossano, 2012), social psychology (Gómez et al., 2011; Norton & Gino, 2014; Swann et al., 2012; Vohs, Wang, Gino, & Norton, 2013; Whitehouse, McQuinn, Buhrmester, & Swann, 2014) and evolutionary anthropology (Atkinson & Whitehouse, 2011; Boyer & Liénard, 2006; Ruffle & Sosis, 2007) have opened up new avenues for research on ritual, a psychologically understudied yet pervasive feature of human social group cognition and behavior. Rituals, which I define as conventional, causally opaque procedures, are uninterpretable from the perspective of physical causality because they lack an intuitive or observable causal connection between the specific action performed (e.g., synchronized dancing) and the desired outcome or effect (e.g., making it rain) ((Legare & Souza, 2012, 2014). The dearth of psychological research on this topic is striking given that ritual is a universal cultural phenomenon and has been the focus of extensive anthropological inquiry. Anthropologists have long proposed that rituals demonstrate commitment to in-group members by signaling group member identity, promoting interpersonal bonding, and creating shared beliefs (Humphrey & Laidlaw, 1994; Rappaport, 1999; Whitehouse & Lanman, 2014).

There is substantial evidence that humans have evolved a variety of psychological adaptions for group living (Caporael, 1997; Kurzban & Neuberg, 2005; Richerson et al.,

---

[1] Wen, N. J., Herrmann, P. A. & Legare, C. H. (2016). Ritual increases children's affiliation with in-group members. *Evolution and Human Behavior, 37*(1) 54-60. doi:10.1016/j.evolhumbehav.2015.08.002
Wen designed the study, collected the data, conducted the analyses, and wrote the manuscript for publication. Legare co-designed the study, advised the analyses, and co-wrote the manuscript. Herrmann contributed to the research design.

2003; Tooby et al., 2006). Social group cognition is a developmentally privileged process that occurs very early in human development (Killen & Rutland, 2011). Young children are well prepared to become social groups members (Diesendruck & Markson, 2011; Legare & Watson-Jones, 2015; Rhodes, 2012; Watson-Jones & Legare, 2016). Some social categories are highly essentialized by young children (Gelman, Heyman, & Legare, 2007; Hirschfeld, 1996), especially those categories with high evolutionary functionality (Diesendruck, Goldfein-Elbaz, Rhodes, Gelman, & Neumark, 2013)

The early-developing propensity for social categorization is strong. Novel group membership activates in-group biases in adults (Billig & Tafel, 1973; Diehl, 1990; Tajfel, 1970; Tajfel, Billig, & Bundy, 1971; Tajfel & Turner, 1979) and children (Abrams & Rutland, 2008; Dunham, Baron, & Banaji, 2008; Nesdale & Flesser, 2001; Rhodes, 2012). Young children placed in novel social groups (i.e., based on t-shirt color) have expectations for in-group reciprocity, positive behavioral attributions for the in-group, and preferences for in- over out-group members (Dunham, Baron, & Carey, 2011). Young infants are also biased to interact more with in-group members (Kinzler, Dupoux, & Spelke, 2007). Infants have expectations that group members will act similarly (Powell & Spelke, 2013) and imitate in-group members more frequently than out-group members (Buttelmann, Zmyj, Daum, & Carpenter, 2013).

Children readily learn and adhere to the conventions of their social groups (Heyes & Frith, 2014; Kalish, 2005). Young children comply with social norms (Diesendruck & Markson, 2011) and engage in normative protest when rules are violated (Rakoczy, Warneken, & Tomasello, 2008). By 4-years-old, children attribute conventional knowledge selectively to in-group members (Diesendruck, 2005). Young children also expect group members to behave in conventional ways (customs, traditions, and etiquette)

and distinguish between conventional and moral rules (Killen & Rutland, 2011; Smetana, 2006; Turiel, 1998).

Much of cultural learning is motivated by affiliative goals, resulting in the acquisition of conventional behavior. Children are acutely sensitive to relations among individuals (Chudek, Heller, Birch, & Henrich, 2012; Kalish, 2013; Nielsen & Blank, 2011), particularly to whether two or more individuals act or make judgments in the same way (Corriveau, Fusaro, & Harris, 2009; Pasquini, Corriveau, Koenig, & Harris, 2007). Children are sensitive to social pressure to conform with a peer group, even when no instrumental knowledge is gained, and publicly disguise correct judgments to conform to the erroneous consensus (Haun, Rekers, & Tomasello, 2014; Haun & Tomasello, 2011).

Children are precocious social learners, well-equipped to engage in high fidelity imitation, a potential indicator of group affiliation through conformity (Herrmann et al., 2013; Over & Carpenter, 2009, 2012). Overimitation may be an adaptive human social learning strategy facilitating the rapid social learning of instrumental skills and may be employed at the expense of efficiency (Flynn & Whiten, 2008; Whiten, McGuigan, Marshall-Pescini, & Hopper, 2009). High fidelity imitation in children has also been linked to social concerns (Nielsen, 2006; Over & Carpenter, 2012), such as encoding normative behavior (Kenward, Karlsson, & Persson, 2011; Nielsen et al., 2015) and fear of ostracism (Over & Carpenter, 2009; Watson-Jones et al., 2014, 2016). This suggests that children's motivation to engage in high fidelity imitation may be inherently motivated by affiliating with social groups (Legare & Watson-Jones, 2015; Over & Carpenter, 2012). Based on these early developing capacities, Chudek and Henrich (2011) and Chudek, Zhao, and Henrich (2013) take a culture-gene coevolved "norm psychology" approach to support early developing reasoning about conventional behavior, which I argue is a prerequisite for ritual learning.

New research on the cognitive developmental foundations of ritual has examined imitative behavior as a means of affiliation with social groups (Clegg & Legare, 2016b; Herrmann et al., 2013; Legare & Herrmann, 2013; Legare & Nielsen, 2015; Watson-Jones et al., 2014, 2016). When excluded by an in-group, adults are motivated to affiliate with the in-group by utilizing selective and nonconscious mimicry (Lakin, Chartrand, & Arkin, 2008). This may be because individuals cope with ostracism by engaging in behaviors aimed at reinclusion (see Williams & Nida, 2011 for a review). Adults also engage in higher levels of emotional facial mimicry of in- over out-group members (Bourgeois & Hess, 2008).

I hypothesize that the performance of socially shared rituals amplifies the early developing and empirically documented preference for in-group members over out-group members (Legare & Wen, 2014). This hypothesis is consistent with new research investigating the extent to which rituals function as a mechanism for increasing social group cohesion (Whitehouse & Lanman, 2014). Rituals facilitate high fidelity cultural transmission, by (a) serving as social identity markers (e.g., dressing in a particular way) (Cosmides & Tooby, 2013), (b) demonstrating commitment to the group (e.g., more costly rituals signal commitment to group values) (Henrich, 2009; McElreath et al., 2003), (c) facilitating cooperation with their coalition (e.g. rituals signal group commitment and increase group cooperation) (Ruffle & Sosis, 2007; Sosis & Bressler, 2003; Sosis & Ruffle, 2003), and (d) increasing group cohesion (e.g., rituals serve as mechanisms for social cohesion and foster longevity of social groups) (Atkinson & Whitehouse, 2011; Soler, 2012). Because rituals are resistant to individual innovation and change, they facilitate coordinated and cooperative group action, essential to solving important human adaptive problems associated with group living (Legare & Watson-Jones, 2015; Watson-Jones & Legare, 2016).

How best to examine the effects of complex social behavior such as ritual on group affiliation? There are several frequently co-occurring features of rituals that I hypothesize make them ideal candidates for amplifying social group affiliation and cohesion. Rituals are socially scripted, are frequently accompanied by normative or conventional language, and involve synchrony (i.e., coordinated movement matched in time (Bernieri & Rosenthal, 1991)) within groups (Hove & Risen, 2009; Kirschner & Tomasello, 2010; Marsh et al., 2009; Wiltermuth & Heath, 2009). New developmental research has documented that characteristic features of ritual have effects on imitative fidelity, a measure of affiliation. Children engage in higher imitative fidelity after (a) witnessing start- and end-state equivalence in an action sequence (Legare et al., 2015; Watson-Jones et al., 2014), (b) hearing conventional language (e.g., "everyone does it this way") rather than instrumental language (e.g., "she makes a necklace") (Clegg & Legare, 2016b; Herrmann et al., 2013; Legare et al., 2015), (c) observing multiple actors engage in the same behavior versus observing one actor engage in the same behavior multiple times (Herrmann et al., 2013), and (d) observing behavior done in synchrony versus in succession (Herrmann et al., 2013). In the current study, rather than attempt to examine the effects of each of these features independently, our objective was to examine their cumulative effects compared to a matched social group experience. Does participating in a ritual increase in-group affiliation to a greater extent than group membership alone?

Despite the large literature on children's reasoning about social groups, this is the first study to our knowledge examining the role of ritual participation on children's affiliation with in-group members. A novel social group paradigm (Tajfel, 1970) was used to examine the hypothesis that the experience of participating in a ritual may increase preference for in-group members, an effect I predicted to be greater than experiencing social group activity alone. Across conditions, children were first assigned to a novel social

group in an afterschool program setting (i.e., yellow or green group). In the ritual condition, children in each group participated in a scripted, synchronous necklace-making task that was demonstrated by a group leader. In the control condition, children in each group participated in a non-scripted necklace-making task that was supervised by a group leader. The language children heard to describe each group and the amount of social experience in a group setting were identical across conditions. I predicted that children in the ritual condition would demonstrate stronger in-group affiliation than children in the control condition.

METHOD

Participants

Seventy-one 4-11-year-olds (42% female, 58% male; M_{age} = 7 years, 4 months; range = 4 years, 2 months to 11 years, 6 months) were recruited at two afterschool program locations in the American southwest. Participants were primarily from working-class families (66% of children attending school at the locations tested are economically disadvantaged) based on school district records (i.e., eligible for free or reduced-price lunch or other public assistance). Participants were also ethnically diverse (51% Hispanic, 39% White, 7% African-American, and 3% other ethnicities). Sample size was determined prior to data collection via power analysis using a predicted effect size of d = 0.80 based on previous research using similar experimental paradigms. The power analysis suggested a sample size of 26 subjects per group, power (1- β err prob) = .80. I concluded data collection when I ran the study in two schools (one per condition). Our sample size (N = 71) exceeded the suggested sample size (N = 52) because I collected data from all consented individuals, so as not to exclude children that wished to participate.

Materials

Across conditions, yellow and green wristbands were used to demarcate novel social groups. I provided each child with a plastic bag of materials including a yellow string, a green string, and three colors of beads – yellow (in-/out- group color), green (in-/out- group color), and orange (distractor color). Each color of bead included two star shaped beads, two heart shaped beads, two circular beads, and two square beads, for a total of 24 beads. Yellow and green visors were used in one of the post-test questions.

Procedure and Coding

Children from two locations of an afterschool program participated in this study. One location participated in the ritual condition (n = 34; 41% female, 59% male; M_{age} = 7 years, 8 months; range = 4 years, 11 months to 11 years, 6 months) and another location participated in the control condition (n = 37; 43% female, 57% male; M_{age} = 7 years, 2 months; range = 4 years, 2 months to 10 years, 5 months). I ran each condition in different locations to ensure that children in the ritual condition did not transmit information from the social group activities to the control condition (since they would be spending time together outside of the experimental manipulations). The afterschool programs were both run by the same company at the different sites. The curricula, structure of the daily activities (e.g., type of activities, schedules, rules and regulations), and teacher training were identical across sites. This indicates there should not be differences in ritualistic activities or traditions in regards to ritualistic practice and intergroup competition at one location over another. In addition to being matched by curricula and structure, the afterschool program locations were also matched for ethnic diversity, sex, and SES. In the ritual condition, 76% of children attending the program and in the control condition, 57% of children attending the program were considered economically disadvantaged based on school district records. The ethnic diversity of the participants was comparable as well. In

the ritual condition, the ethnic composition was 53% Hispanic, 29% White, 12% African-American, and 6% other ethnicities. In the control condition, the ethnic composition was 49% Hispanic, 49% White, and 3% African-American.

Across locations and conditions, children were randomly assigned to either the yellow group (n = 17 in the ritual condition, n = 18 in the control condition), or the green group (n = 17 in the ritual condition, n = 19 in the control condition). Sex and ethnic compositions were comparable across condition by color group. In the ritual condition (green group), the sex breakdown was 47% female and 53% male. The ethnic breakdown was 65% Hispanic, 18% White, 12% African-American, and 6% other ethnicity. In the ritual condition (yellow group), the sex breakdown was 35% female and 65% male. The ethnic breakdown was 41% Hispanic, 41% Caucasian, 12% African-American, and 6% other ethnicity. In the control condition (green group), the sex breakdown was 42% female and 58% male. The ethnic breakdown was 47% Hispanic and 53% White. In the control condition (yellow group), the sex breakdown was 44% female and 56% male. The ethnic breakdown was 50% Hispanic, 44% White, and 6% African-American.

In both conditions, children had an identical amount of exposure to the language relating to their group. In each condition, the color wristbands were introduced, "In this program, we have two groups of children, the green group and the yellow group! You are in the yellow [green] group. Each day you'll put this on to remind you that you are in the yellow [green] group and you'll take it off at the end of the day. Neither group is better than the other; there are just two separate but equal groups. Now each color group is going to use their objects in the special way. I want the yellows to learn together over here, and the greens to learn together over there. Yellow group line up to get your objects, and green group line up to get your objects." In each condition, children were presented with the identical bags of beads and string (described in Materials).

Across conditions, children wore colored wristbands of their in-group daily for two weeks. During this period, they participated in six social group activities of their in-group within their condition. A two week time period was selected in order to allow for repeated exposure to the social group activity. Two confederate adult females (matched for age, ethnicity), acted as group leaders, supervising each color group, in each condition. The group leader was dressed in a yellow or green t-shirt and a corresponding yellow or green visor. In both the ritual condition and the control condition, children participated in a social group activity. In both conditions, the same pair of group leaders led the social group activity. In the ritual condition, the social group activity was a ritual task (i.e., scripted group necklace-making task). In the control condition, the social group activity was a non-scripted necklace-making task, using the same materials as the ritual task.

Social Group Activity

In the ritual condition, group leaders for each color group supervised participants in a quiet area of the afterschool program location where there were two lines taped to the floor, one green and one yellow. Colored lines were used to organize children into groups. Each leader asked their respective color group to sit on the matching colored line and passed out bags of beads and string. Once all children received their bags, the leaders sat down in front of their respective groups and in the green group said, "Okay green group, we are going to play with these beads in a special way, the way the green group does it! Watch what I'm doing!" [Pick up a green star]. "First, hold up a green string. Then, touch a green star to your head. Then, string on a green star." [Touch a green star to head and string it on. Pick up a green circle]. "Next clap your hands 3 times. Then string on a green circle." [Clap hands 3 times and then string the green circle on. Pick up a green square]. "Next, touch a green square to your head. Then, string on a green square." [Touch a green

square to head and string it on. Pick up a green heart]. “Next clap your hands 3 times. Then string on a green heart.” [Clap hands 3 times and then string the green heart on. Pick up a green star]. “Next, touch a green star to your head. Then, string on a green star.” [Touch a green star to head and string it on. Pick up a green circle]. “Next clap your hands 3 times. Then string on a green circle.” [Clap hands 3 times and then string the green circle on. Pick up a green square]. “Next, touch a green square to your head. Then, string on a green square.” [Touch a green square to head and string it on. Pick up a green heart]. “Next clap your hands 3 times. Then string on a green heart.” [Clap hands 3 times and then string the green heart on]. “Now, take the beads off and do it again!” [Remove beads from string and repeat ritual as scripted]. After ten minutes, children were asked to put away the beads and the bags were collected from them. “Okay, we’re all done! You did it the way the green group does it! Good job!” The scripted activity was done in synchrony with the children (i.e., verbal instructions were given and the children performed the instructed behaviors simultaneously with the group leader), was modeled twice per session, and took approximately ten minutes to complete (see Table 3 for a detailed description of the scripted tasks used in the ritual condition by color group). Children participated in this activity three days a week for two weeks.

Order of Action	Green Group		Yellow Group	
	Bead	Gesture	Bead	Gesture
1st		Touch Star to Forehead		3 Hand Claps
2nd	String Star		String Square	
3rd		3 Hand Claps		Touch Heart to Forehead
4th	String Circle		String Heart	
5th		Touch Square to Forehead		3 Hand Claps
6th	String Square		String Star	
7th		3 Hand Claps		Touch Circle to Forehead
8th	String Heart		String Circle	

Table 3: Ritual condition group leader actions by color group. Structured play task for the green and yellow groups in the ritual condition (each group repeated the sequence twice).

In the control condition, group leaders for each color group supervised participants in a quiet area of the afterschool program location where there were two lines taped to the floor, one green and one yellow (the same set up as in the ritual condition). Using the same language as in the ritual condition, each leader asked their respective color group to sit on the matching colored line and passed out bags of beads and string. Once all children had received their bags, the leaders sat down in front of their respective groups and said, "Okay yellow [green] group, we are going to play with these beads in a special way, the way the yellow [green] group does it!" [Children engaged in unstructured necklace making and

bead stringing]. After ten minutes, children were asked to put away the beads and the bags were collected from them. “Okay, we’re all done! You did it the way the yellow [green] group does it! Good job!” Children participated in this activity three days a week for two weeks.

Across conditions, children were allowed to interact with the materials during the social group activity for ten minutes each time. During this time, the vast majority of children strung beads on string. Many children tied the beads and string around their necks, though they were never instructed to do so. After the ten-minute period, they were instructed to put all the beads and string back into the plastic bag they were given. The group leader then collected all the plastic bags. Retrieving the materials from the children controlled for amount of exposure to the materials. Across conditions, the color group leaders always supervised the social group activity and during the social group activity that differed between conditions, children heard the word “group” three times per session. Across conditions, there were also very high levels of social interaction in both of the color groups throughout the two-week period.

Post-Test Measure

After the two-week period in which children participated in the social group activities, they were interviewed individually about their attitudes towards in- and out-group members. The interview questions were asked on the same day as the last social group activity to control for attendance. All children completed a post-test questionnaire consisting of an in-group affiliation measure administered by research assistants, who were blind to hypotheses and did not serve as group leaders.

In-Group Affiliation Measure

Children were presented with an in-group affiliation measure consisting of four questions about their affiliation with members of their in-group versus the out-group: an in-group membership question, an in-group identification question, an in-group preference question, and an in-group privilege question. For the in-group membership question, children were asked, "If you could change the color of your wristbands, would you change it or would you keep it the same?" For the in-group preference question, children were asked, "If a new student came to your class, and your teacher let them pick a color group, would they want to pick the green group or the yellow group?" For the in-group privilege question, the children were told, "We're going to another afterschool program next, and they need to know who you think should be group helpers." Then they were asked, "Should it be a kid from the green group, or a kid from the yellow group?" For the in-group identification question, children were told, "Thank you for helping us out. We're passing out hats once everyone is done." Then they were asked, "Would you like a green or a yellow hat?" For each answer favoring their in-group, children were given a score of 1. For each answer favoring the out-group, they were given a score of 0. Each question was designed to assess in-group affiliation and I did not have unique predictions about each question by condition, so the data were analyzed as a composite score.

Attendance Records

Detailed attendance records were kept for the number of days wristbands were worn (out of 10) and the number of social groups activities attended (out of 6). An independent samples t-test indicated that there was no difference in the number of days children wore wristbands between the ritual condition ($M = 8.00$, $SD = 2.09$, range = 6-10 days) and the control condition ($M = 8.57$, $SD = 1.26$, range = 3-10 days), $t(53.27) = -1.37$, $p = .176$. An independent samples t-test indicated that there was no difference in the number of days

children participated in the social group activity in the ritual condition (M = 4.12, SD = 1.51, range = 2-6 days) and the control condition (M = 4.57, SD = 1.41, range = 2-6 days), $t(67.29) = -1.30$, $p = .200$.

RESULTS

In-group Affiliation Measure

A composite score was created by summing the individual scores of each in-group affiliation question (0-4). Each question was designed to assess aspects of in-group affiliation, so the data were analyzed as a composite score. A one-way analysis of covariance (ANCOVA) was conducted with the in-group affiliation composite score as the dependent variable, condition (2: ritual and control) as the independent variable, and attendance as the covariate. A preliminary analysis evaluating the homogeneity of slopes assumption indicated that the relation between attendance and in-group affiliation did not differ significantly as a function of condition, $F(1, 67) = 3.35$, $p = .072$, partial $\eta^2 = .05$. Levene's test was not significant, $F(1, 69) = 0.01$, $p = .938$, indicating that the assumption of homogeneity of variance was not violated. The ANCOVA revealed a significant effect of condition after accounting for attendance, $F(1, 68) = 4.54$, $p = .037$, partial $\eta^2 = .06$ (see Figure 1). Overall, children in the ritual condition had higher in-group affiliation composite scores ($M_{observed} = 3.03$, $SD_{observed} = 1.00$) than children in the control condition ($M_{observed} = 2.59$, $SD_{observed} = 1.14$). The adjusted means of the in-group affiliation composite scores children were $M_{adjusted} = 3.08$, $SD_{adjusted} = 1.04$ in the ritual condition and $M_{adjusted} = 2.55$, $SD_{adjusted} = 1.05$. To test if the basic minimal group effect was observed, children's in-group affiliation composite scores in the control condition were compared to chance (M = 2.00 out of 4.00). Children's in-group affiliation composite scores in the control condition significantly differed from chance, $t(36) = 3.17$, $p = .003$. Attendance was significantly related to in-

group affiliation, $F(1,68) = 6.25$, $p = .015$, partial $\eta^2 = .08$. There were also no significant effects on in-group affiliation by group color (i.e., yellow versus green) ($t(66.82) = 1.33$, $p = .187$) or sex ($t(64.96) = -0.87$, $p = .387$). A simple linear regression showed that age[2] (in months) was not a significant predictor of in-group affiliation, $F(1, 69) = 0.74$, $p = .392$.

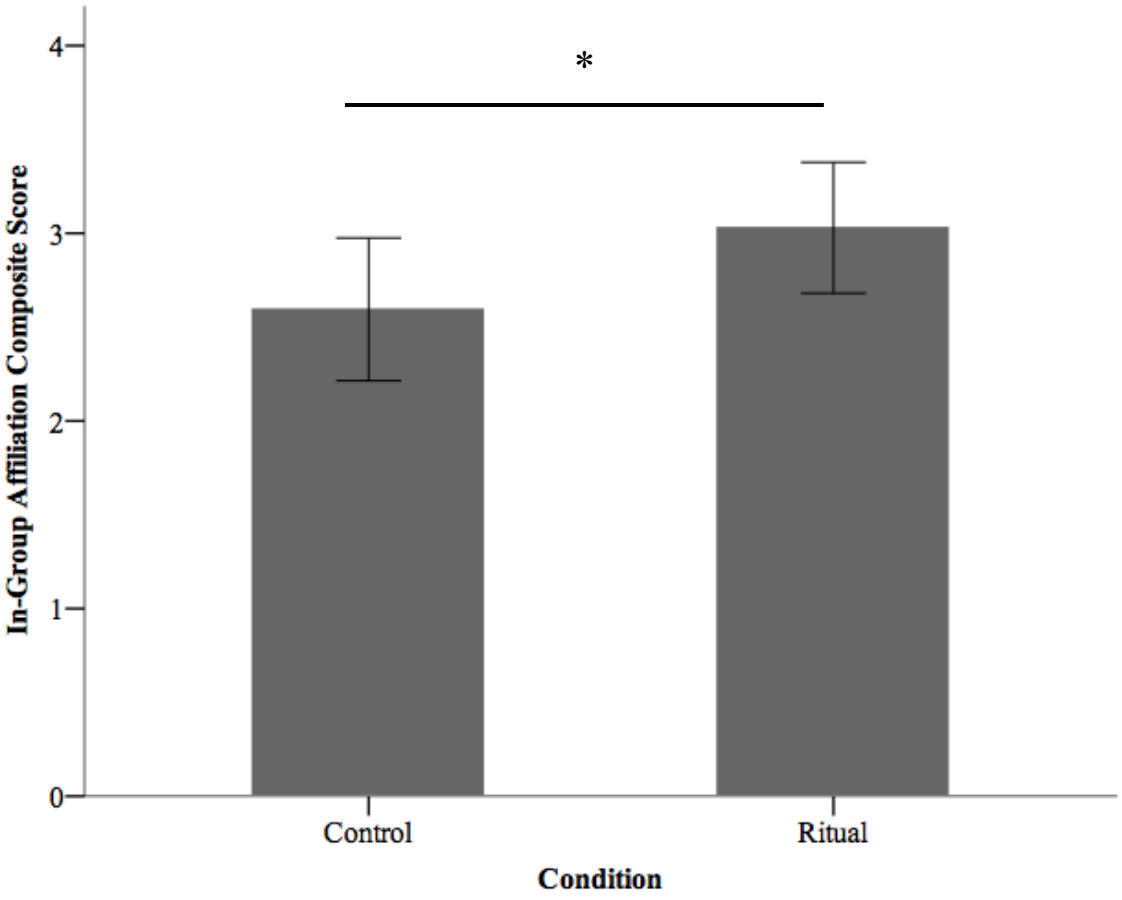

Figure 1: Observed mean in-group affiliation composite score by condition. Error bars represent 95% confidence intervals.

[2] For the published version of this manuscript, age was considered as a predictor, but future analyses could consider age as a covariate.

DISCUSSION

The role of ritual in enhancing group cohesion has received little empirical attention to date, in part because the complexity and historical diversity of the world's ritual traditions have impeded the identification of common key features of ritualistic behavior (Rossano, 2012). This has made it difficult to establish robust generalizations about the causes and effects of these features in isolation or interaction. Because rituals have been studied almost entirely qualitatively (but see Legare & Souza, 2012, 2014; Norton & Gino, 2014; Vohs et al., 2013 for exceptions), it has proven difficult to make strong causal inferences about the impact of ritual on human cognition and behavior.

Examining the development of ritual has important implications for understanding the ontogeny of cultural learning in childhood (Legare & Watson-Jones, 2015) and for informing our understanding of the evolution of social cognition (Brewer, 2007; Kurzban & Neuberg, 2005; Richerson & Boyd, 2005). Yet very little is known about the development of ritual. Existing research suggests that adolescence may be the preferred developmental period for religious and ritual transmission due to changes in brain function that make them most receptive to social, emotional, and symbolic stimuli (Alcorta & Sosis, 2005). However, new work on the ontogeny of ritual indicates that children as young as 3-years-old are well-prepared to reason about social conventionality, a core feature of ritual cognition (Clegg & Legare, 2016b; Herrmann et al., 2013; Legare et al., 2015; Watson-Jones et al., 2014, 2016). Our data demonstrate that the experience of participating in a ritual increases in-group preference in childhood, much earlier than previous research has suggested. This is consistent with what I would expect if the capacity to engage in ritual is a psychologically-prepared, culturally-inherited, behavioral trademark of our species.

I propose that examining the psychological effects of ritual in the context of children's social groups informs our understanding of the empirically documented and

early developing human tendency to prefer in-group members to out-group members (Legare & Watson-Jones, 2015; Legare & Wen, 2014). Our data are consistent with the hypothesis that ritual increases in-group affiliation. The experience of participating in a ritual (ritual condition) increases in-group affiliation to a greater degree than group membership alone (control condition), when you account for the amount of experience with the social group activity (attendance). Furthermore, because the same children had repeated exposure to the same social group activity over a two-week period and remained marked in their social groups throughout the time they spent at the afterschool program, ecological validity was high.

The current results provide novel empirical evidence for the effects of ritual participation on children's in-group affiliation; however, more research is needed to experimentally manipulate different features of ritual to examine its effects on psychological outcomes. There are several frequently co-occurring features of rituals that I hypothesize make ritual an ideal candidate for amplifying social group affiliation and cohesion. Rituals are socially scripted, frequently accompanied by conventional language, and involve social group coordination and behavioral synchrony. In the current study, rather than attempt to examine the effects of each of these features on in-group affiliation independently, our objective was to examine whether participating in a ritual impacts in-group affiliation to a greater extent than group membership alone. The extent to which particular features of ritual individually contribute to the documented effects on in-group affiliation is a topic I am examining in ongoing research. Additionally, the rituals used here do not involve supernatural or religious elements. Previous work has examined the factors that make non-religious rituals most efficacious (Legare & Souza, 2012), as well as the effect of these rituals on perceived control (Legare & Souza, 2014; Norton & Gino,

2014) and consumption (Vohs et al., 2013). Our data demonstrate that rituals increase in-group affiliation without invoking the supernatural.

Recent findings in psychological research support that because ritual participation involves shared experiences amongst group members, they may provide a mechanism for "fusing" the self with relational and collective groups (Atkinson & Whitehouse, 2011; Swann et al., 2012; Swann, Gómez, Seyle, Morales, & Huici, 2009). Highly fused individuals feel a sense of 'oneness' with the group, supporting the development of strong relational ties and lasting commitment to in-group members (Swann et al., 2012). This is most commonly associated with the imagistic mode (low-frequency, high arousal) of religiosity (Whitehouse, 2004). Notably, there are two forms of social cohesion: identity fusion and group identification (Whitehouse & Lanman, 2014). Identity fused individuals experience a social identity becoming an essential component of one's personal self concept (Swann et al., 2012) and group identified individuals share prototypical features with in-group members, non-essential to personal identities (Gómez et al., 2011). These data support the findings that participation in a collective ritual enhances group identification, and can be considered most characteristic of the doctrinal mode (high-frequency, low arousal) of religiosity. Future ethnographic research may shed light on the kinds of rituals that create group fusion in children.

There is evidence that engaging in synchronous movement (even synchronous singing) may increase cooperation, prosociality, as well as self-reported feelings of connection to and trust of group members (Cohen, Ejsmond-Frey, Knight, & Dunbar, 2010; Konvalinka et al., 2011; Reddish, Fischer, Bulbulia, & Szolnoki, 2013; Wiltermuth & Heath, 2009). Kirschner and Tomasello (2010) found that synchronous joint-music making increases prosociality in 4-year-olds. Our work expands upon this by working with larger groups (*n* = 17-19/group with 4 groups compared to n= 2/group with 48 groups*)*. I also

conducted the work in a school over a laboratory setting, increasing the ecological validity. In addition, our participants had repeated exposure to the same synchronous activity (6 times over 2 weeks) and had the presence of an out-group, unlike previous research's single exposure with no out-group (Kirschner & Tomasello, 2010). Other research, however, suggests that synchrony may not be sufficient to increase prosociality and cooperation with in-group members (Cohen, Mundry, & Kirschner, 2014) and may even increase prosociality towards out-group members (Reddish, Bulbulia, & Fischer, 2013) in adults. Notably, previous research has only examined a single exposure to a synchronous group activity. Our study builds upon this literature by investigating the effects of repeated exposure to a more complex synchronous in-group activity (e.g., bead stringing with a collective goal) rather than a purely "mechanical" one (e.g., drumming) on children's in-group affiliation.

Rituals provide a solution to one of the greatest challenges of social group living, the problem of coordinated and cooperative group action (Tooby et al., 2006). Due to the importance of group membership for our cultural species, I propose that humans are psychologically prepared to engage in socially stipulated, conventional behavior such as ritual as a means of in-group affiliation. Rituals serve four core functions that address the adaptive problems of group living by acting as social identity markers, demonstrating commitment to the group, facilitating cooperation with their coalition, and increasing group cohesion (Legare & Watson-Jones, 2015). Human psychology is thus geared to motivate individuals to engage in behaviors that increase inclusion within their social groups. Our data support the hypothesis that the experience of participating in a ritual increases in-group affiliation to a greater degree than group membership alone and provide evidence consistent with the proposal that rituals facilitate in-group cohesion in early childhood.

Chapter 3: Examining Ritual and Children's Social Group Interaction

Group living has long solved adaptive problems faced by humans (Buss, 1990; Buss & Kenrick, 1998), and humans have evolved a variety of psychological adaptations to facilitate this goal (Caporael, 1997; Kurzban & Neuberg, 2005; Richerson et al., 2003; Tooby et al., 2006). Collective ritual actions serve as an adaptive mechanism for creating social cohesion and building coalitions (Bloch, 1991; Durkheim, 1915; Gluckman, 1954; Turner, 1969; Whitehouse & Lanman, 2014). Here, I define rituals as socially stipulated (or prescribed by social norms), causally opaque procedures, meaning they are uninterpretable from the perspective of physical causality because they lack an intuitive or observable causal connection between the specific action being performed and desired outcome or effect (Legare & Souza, 2012, 2014; Sørensen, 2007). Rituals are frequently accompanied by conventional language, group coordination, and behavioral synchrony (Hove & Risen, 2009; Kirschner & Tomasello, 2010; Marsh et al., 2009; Wiltermuth & Heath, 2009).

Collective rituals serve core functions within social groups to facilitate group cohesion (Legare & Watson-Jones, 2015; Watson-Jones & Legare, 2016). First, rituals serve as group identity markers and participating in a collective group ritual serves as a way to identify yourself as an in-group member. By participating in in-group rituals, this demonstrates commitment to the group, particularly if the ritual is costly. Because rituals demonstrate commitment to the group, they also facilitate cooperation with social coalitions. Participation in rituals promotes interpersonal bonding and signals shared beliefs, thereby increasing social cohesion and increasing the longevity of the cultural group. Because rituals increase cohesion, they promote high fidelity cultural transmission

and are able to be passed between generations. Children must learn group rituals to in order to become a competent cultural group member.

Children are highly sensitive to cues to group membership and social group cognition is a developmentally privileged process that occurs early in development (Diesendruck & Markson, 2011; Killen & Rutland, 2011; Legare & Watson-Jones, 2015; Rhodes, 2012; Watson-Jones & Legare, 2016). Young children are well-prepared to become members of social groups and even view w social categories as having a stable, unchanging psychological "essence" (Gelman et al., 2007; Hirschfeld, 1996). Even infants expect members of social groups to act similarly (Powell & Spelke, 2013) and are more likely to imitate in-group over out-group members (Buttelmann et al., 2013). Simply placing individuals into arbitrary groups creates in-group biases among adults and children. When children experience novel social groups (e.g., wearing a colored shirt assigned to a group membership), they have expectations for in-group reciprocity, positive behavioral attributions for in-group, and preferences for in- over out-group members (Dunham et al., 2011). This motivation to be a part of a social group serves as a prerequisite for learning conventions, like rituals.

Children are keen to learn conventions of their social group (Heyes & Frith, 2014; Kalish, 2005), and are very sensitive to social norms and rules (Diesendruck & Markson, 2011; Rakoczy et al., 2008). Ritual learning is motivated by affiliative goals and children are well-equipped to engage in high fidelity imitation to identify and acquire rituals. Recent developmental psychology research has documented that frequently co-occurring features of ritual have independent effects on imitative fidelity of group member behavior, a measure of affiliation (Clegg & Legare, 2016b; Herrmann et al., 2013; Legare et al., 2015; Watson-Jones et al., 2014, 2016).

Recent evidence has found that children are motivated to engage in the conventional and normative behaviors of their social group as an indication of group membership and means of affiliation and inclusion (Watson-Jones et al., 2014, 2016). Individuals who do not participate in shared rituals face the threat of ostracism from the group (Watson-Jones et al., 2016). Watson-Jones and colleagues (2014) examined task specific effects of third-party ostracism on imitative fidelity in early childhood. Start- and end-states of action sequences were manipulated to examine the effects of priming third-party ostracism versus affiliation on children's imitation of instrumental (i.e., action sequence with a different start- and end-state) versus social convention (i.e., action sequence with an identical start- and end-state) tasks. Children's performance was coded for imitative fidelity and children's explanations for their behavior. As predicted, imitative fidelity was highest and social convention explanations were most common when primed with ostracism in the social convention task. The data are consistent with our proposal that imitation serves an affiliative function in response to the threat of ostracism, a response amplified for social conventions.

Watson-Jones and colleagues (2016) used the Cyberball paradigm to examine the hypothesis that children use high-fidelity imitation as a reinclusion behavior in response to being ostracized by in-group members. Children were either included or excluded by in- or out-group members and then shown a video of an in-group or an out-group member enacting a social convention. Participants who were excluded by their in-group engaged in higher-fidelity imitation than those who were included by their in-group. Children who were included by an out-group and those who were excluded by an out-group showed no difference in imitative fidelity. Children ostracized by in-group members also displayed increased anxiety relative to children ostracized by out-group members. The data are

consistent with the proposal that high-fidelity imitation functions as reinclusion behavior in the context of in-group ostracism.

Participation in a group ritual also increases children's self-reported affiliation with in-group members to a greater degree than group membership alone (Wen et al., 2016). A novel social group paradigm was used in an afterschool program to test the influence of a ritual versus a control task on a measure of affiliation with in-group versus out-group members. The data support the hypothesis that the experience of participating in a ritual increases in-group affiliation to a greater degree than group activity alone. The results provide insight into the early- developing preference for in-group members and are consistent with the proposal that rituals facilitate in-group cohesion. These data support the proposal that humans are psychologically prepared to engage in ritual as a means of in-group affiliation.

While I know that children affiliate more with in-group members after participating in a ritual, I do not know what it is exactly about being in a group that has this effect. What aspects of being in a group and participating in a collective ritual could be driving the self-reported affiliation? Using a mixed-methodological approach, the present study examines the role of ritual in children's social group cognition in learning and transmitting culture. Building off the proposed link between ritual and group affiliation (Wen et al., 2016), this study examines how rituals increase group cohesion. This study examines the effect of participating in ritualistic activity on children's interaction toward in- and out-group members over group membership alone. I examine children's displays of group competence signals to in-group peers and in-group leaders, as well as attention toward in-group peers, in-group leaders, out-group members, and task materials. I hypothesize that ritual participation would produce different behavioral tradeoffs in terms of attention and displays toward group members when compared to group membership alone. I predicted

that ritual participation (1) will increase increases children's attention to in-group leaders because children are learning the group ritual, (2) will increase children's attention to out-group members because they have a piqued interest and awareness of out-group members. I predict that engaging in an in-group ritual makes group membership more salient, and thus children will be more aware of an out-group presence. As a result of increased interest learning the in-group ritual and attending to out-group members, children in the ritual condition (3) will decrease their attention to in-group peers and (4) will decrease their attention to their materials in comparison to children who engaged in social group activity alone. Because children in the ritual condition will be occupied with engaging in a scaffolded ritual activity, they would not attend to their own materials and in-group peers as much as control condition. I also hypothesized ritual participation would increase children's display of group competence signals. To show they are good group members, children should display their group-specific knowledge to other group members. I predicted ritual participation will (5) increase children displaying their materials to both in-group leaders and (6) in-group peers.

The results will provide insight into how ritual participation serves to increase cohesion with group members and group leaders, thereby avoiding social exclusion from the group. Studying the emergence of ritualized behavior in childhood provides key insight into the complex dynamics at the heart of social group cognition. Exploring these questions with an eye to child development allows us to ascertain what behaviors are early developing and, perhaps, innate aspects of human cognition.

METHOD

Participants

Forty-nine 4- to 11-years-old (39% female, 61% male; M_{age} = 7 years and 2 months; range = 4 years, 2 months to 11 years, 5 months) were recruited at two afterschool program locations in the American southwest. The majority of participants came from working-class families (66% of children attending school at the locations tested were considered economically disadvantaged) based on school district records (i.e., eligible for free or reduced-price lunch or other public assistance). The sample was also ethnically diverse (51% Hispanic, 39% white, 7% African American, and 3% other ethnicities). I concluded data collection when I ran the study in two schools (one per condition). I attempted to consent as many children from the afterschool program locations as possible and collected data from all consented individuals, so as not to exclude children that wished to participate.

Materials

Across conditions, yellow and green wristbands were used to demarcate novel social groups. I provided each child with a plastic bag of materials including a yellow string, a green string, and three colors of beads- yellow (in-/out-group color), green (in-/out-group color), and orange (neutral color). Each color of bead included two star-shaped beads, two heart-shaped beads, two circular beads, and two square beads, for a total of 24 beads.

Procedure and Coding

Children from two locations of an afterschool program participated in this study. One location participated in the ritual condition (n = 21; 33% female, 67% male; M_{age} = 7 years, 8 months; *range* = 7 years, 8 months to 11 years, 5 months) and another location participated in the control condition (n = 28; 43% female, 57% male; M_{age} = 6 years, 9

months; *range* = 4 years, 6 months to 9 years, 8 months). I ran each condition in different locations to ensure that children in the ritual condition did not transmit information from the social group activities to the control condition. The afterschool programs were both run by the same company at the different sites. The curricula, structure of the daily activities (e.g., type of activities, schedules, rules and regulations), and teacher training were identical across sites. This indicates that there should not be differences in ritualistic activities or traditions in regard to ritualistic practice and intergroup competition at one location over another. In addition to being matched by curricula and structure, the afterschool program locations were also matched for ethnic diversity, sex, and SES. In the ritual condition, 76% of children attending the program and in the control condition, 57% of children attending the program were considered economically disadvantaged based on school district records. The ethnic diversity of the participants was comparable as well. In the ritual condition, the ethnic composition was 53% Hispanic, 29% White, 12% African–American, and 6% other ethnicities. In the control condition, the ethnic composition was 49% Hispanic, 49% White, and 3% African–American.

Across locations and conditions, children were randomly assigned to either the yellow group (n = 11 in the ritual condition, n = 13 in the control condition), or the green group (n = 10 in the ritual condition, n = 15 in the control condition). Sex and ethnic compositions were comparable across condition by color group. In the ritual condition (green group), the sex breakdown was 47% female and 53% male. The ethnic breakdown was 65% Hispanic, 18% White, 12% African-American, and 6% other ethnicity. In the ritual condition (yellow group), the sex breakdown was 35% female and 65% male. The ethnic breakdown was 41% Hispanic, 41% Caucasian, 12% African-American, and 6% other ethnicity. In the control condition (green group), the sex breakdown was 42% female and 58% male. The ethnic breakdown was 47% Hispanic and 53% White. In the control

condition (yellow group), the sex breakdown was 44% female and 56% male. The ethnic break- down was 50% Hispanic, 44% White, and 6% African-American.

In both conditions, children had an identical amount of exposure to the language relating to their group. In each condition, the color wristbands were introduced, "In this program, we have two groups of children, the green group and the yellow group! You are in the yellow [green] group. Each day you'll put this on to remind you that you are in the yellow [green] group and you'll take it off at the end of the day. Neither group is better than the other; there are just two separate but equal groups. Now each color group is going to use their objects in the special way. I want the yellows to learn together over here, and the greens to learn together over there. Yellow group line up to get your objects, and green group line up to get your objects." In each condition, children were presented with the identical bags of beads and string (described in Materials).

Across conditions, children wore colored wristbands of their in-group daily for two days prior to the social group activity. On the third day, the children wore wristbands and then participated in a social group activity. Two confederate adult females (matched for age and ethnicity), acted as group leaders, supervising each color group, in each condition. The group leader was dressed in a yellow or green t-shirt and a corresponding yellow or green visor. In both the ritual condition and the control condition, children participated in a social group activity. In both conditions, the same pair of group leaders led the social group activity. In the ritual condition, the social group activity was a ritual task (i.e., scripted group necklace-making task). In the control condition, the social group activity was a non-scripted necklace-making task, using the same materials as the ritual task.

Social Group Activity

In the ritual condition, group leaders for each color group supervised participants in a quiet area of the afterschool program location where there were two lines taped to the floor, one green and one yellow. Colored lines were used to organize children into groups. Each leader asked their respective color group to sit on the matching colored line and passed out bags of beads and string. Once all children received their bags, the leaders sat down in front of their respective groups and in the green group said, "Okay green group, we are going to play with these beads in a special way, the way the green group does it! Watch what I'm doing!" [Pick up a green star]. "First, hold up a green string. Then, touch a green star to your head. Then, string on a green star." [Touch a green star to head and string it on. Pick up a green circle]. "Next clap your hands 3 times. Then string on a green circle." [Clap hands 3 times and then string the green circle on. Pick up a green square]. "Next, touch a green square to your head. Then, string on a green square." [Touch a green square to head and string it on. Pick up a green heart]. "Next clap your hands 3 times. Then string on a green heart." [Clap hands 3 times and then string the green heart on. Pick up a green star]. "Next, touch a green star to your head. Then, string on a green star." [Touch a green star to head and string it on. Pick up a green circle]. "Next clap your hands 3 times. Then string on a green circle." [Clap hands 3 times and then string the green circle on. Pick up a green square]. "Next, touch a green square to your head. Then, string on a green square." [Touch a green square to head and string it on. Pick up a green heart]. "Next clap your hands 3 times. Then string on a green heart." [Clap hands 3 times and then string the green heart on]. "Now, take the beads off and do it again!" [Remove beads from string and repeat ritual as scripted]. After ten minutes, children were asked to put away the beads and the bags were collected from them. "Okay, we're all done! You did it the way the green group does it! Good job!" The scripted activity was done in synchrony with the children (i.e., verbal instructions were given, and the children performed the instructed behaviors

simultaneously with the group leader), was modeled twice per session, and took approximately ten minutes to complete (see Table 3 for a detailed description of the scripted tasks used in the ritual condition by color group).

In the control condition, group leaders for each color group supervised participants in a quiet area of the afterschool program location where there were two lines taped to the floor, one green and one yellow (the same set up as in the ritual condition). Using the same language as in the ritual condition, each leader asked their respective color group to sit on the matching colored line and passed out bags of beads and string. Once all children had received their bags, the leaders sat down in front of their respective groups and said, "Okay yellow [green] group, we are going to play with these beads in a special way, the way the yellow [green] group does it!" [Children engaged in unstructured necklace making and bead stringing]. After ten minutes, children were asked to put away the beads and the bags were collected from them. "Okay, we're all done! You did it the way the yellow [green] group does it! Good job!"

Across conditions, children were allowed to interact with the materials during the social group activity for ten minutes. After the ten-minute period, they were instructed to put all the beads and string back into the plastic bag they were given. The group leader then collected all the plastic bags. Retrieving the materials from the children controlled for amount of exposure to the materials. Across conditions, the color group leaders always supervised the social group activity and during the social group activity that differed between conditions, children heard the word "group" three times per session. Across conditions, there were also very high levels of social interaction in both of the color groups.

Coding

Each child's behavior in their novel social groups was video-recorded and was coded using Datavyu coding software. The first four minutes of each video was coded in order to assess behaviors during the initial introduction of the social group activities.

Attention

What children spent their time attending to was coded as falling into one of the following categories: the child's own materials, an in-group peer, the in-group leader, the out-group, or other. Children's attention was coded throughout the entirety of the four minute video segment.

Own Materials. To measure children's attention to his or her own materials, I coded for the amount of time each child spent looking at his or her materials. The onset of the behavior started when the child looked toward his or her beads or string and the offset of the behavior started when the child shifted their focus toward a person or object in another category.

In-Group Peer. To measure children's concern with in-group peer activities, I coded for the amount of time each child spent looking at in-group peers. Onset of the behavior began when the child looked toward an in-group peer or an in-group peer's materials and offset began when the child shifted their focus toward a person or object in another category.

In-Group Leader. To measure children's attention to in-group leaders, I coded for the amount of time each child spent looking at the in-group leader. Onset of this behavior began when the child looked toward the in-group leader and offset began when the child shifted focus toward a person or object in another category.

Out-Group. To measure children's awareness of the out-group, I coded for the amount of time children spent looking at out-group members. Onset of this behavior began when the child looked toward the out-group and offset began when the child shifted focus

toward a person or object in another category. At each site, the color groups were seated with the children's backs facing the out-group, so looking at out-group members was a very salient motion (e.g., the child turning to look over his or her shoulder).

Other. Child's attention to anything not captured by the above categories was coded for as 'other' (e.g., looking at another person walking by who was not involved in the activity). Onset of this behavior began when the child looked toward the 'other' object or person and offset began when the child shifted focus toward a person or object in another category.

Displaying Group Competence Signals

To measure displays of group competence signals, I coded for the frequency of displaying group materials to an in-group leader or an in-group peer throughout the entirety of the four minute video clip.

In-Group Leader. This was coded for if it was an intentional gesture on behalf of the child to demonstrate his or her materials to the in-group leader. Onset of this behavior began when the child held up his or her materials toward the group leader and offset began when the child returned the materials to his or her lap or the floor.

In-Group Peer. This was coded for if the child made an intentional gesture to demonstrate his or her materials to an in-group peer. Onset of this behavior began when the child held up his or her materials to an in-group peer and offset began when the child returned the materials to his or her lap or the floor.

RESULTS

Attention

Own Materials

Multiple linear regressions were performed to determine the effects of condition on the average amount of time children spent looking at his or her own materials. There were no predicted significant effects of age, sex, color group, and the number of days wristbands were worn prior, but these components were retained in the model to control for any variance due to differences in these factors.

There was a significant main effect of condition on the average amount of time children spent looking at his or her own materials. Children in the control condition spent more time looking at his or her materials (M = 131.96 seconds, SD = 45.01 seconds) than children in the ritual condition (M = 113.00 seconds, SD = 30.45 seconds), see Figure 2. There was a marginal effect of age on the amount of time children spent looking at his or her materials. See Table 4.

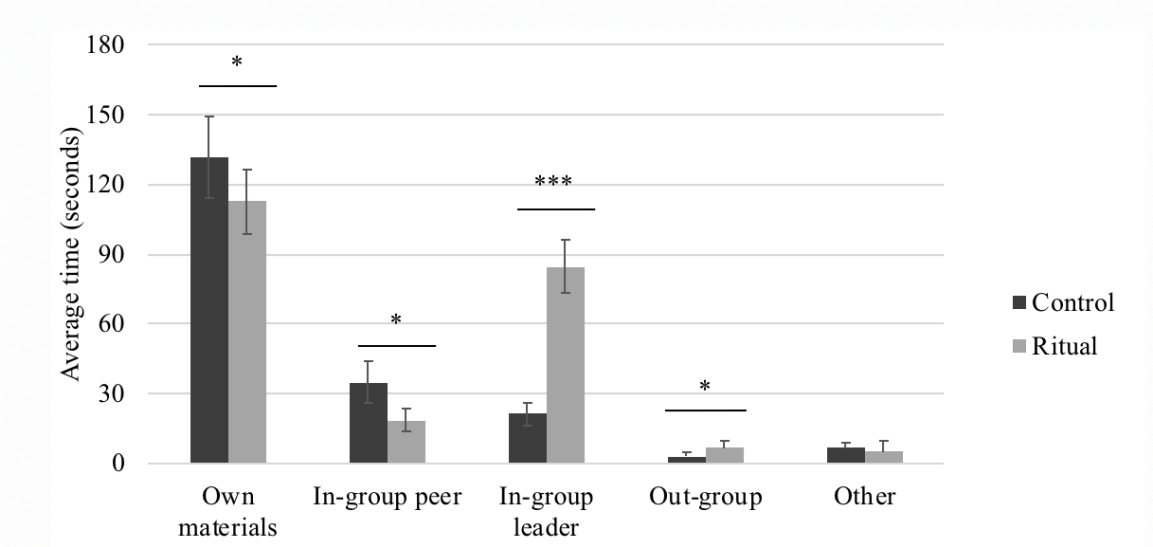

Figure 2: Average amount of time (seconds) spent looking at own materials, in-group peer, in-group leader, out-group, and other by condition. Error bars represent 95% confidence intervals.
*p <.05, ***p < .001

Predictors	Own materials		In-group peer		In-group leader		Out-group		Other	
	ß(*SE*)	95% CI	ß(*SE*)	95% CI	ß(*SE*)	95% CI	ß(*SE*)	95% CI	ß(*SE*)	95% CI
Constant	52.28 (56.32)	[-58.11, 162.66]	72.32 (24.28)**	[24.73, 119.91]	49.90 (29.90)	[-8.69, 108.50]	11.91 (7.50)	[-2.78, 26.61]	9.03 (11.04)	[-12.62, 30.67]
Condition (Ritual)	-26.36 (12.06)*	[-50.00, -2.72]	-13.91 (5.20)*	[-24.10, -3.72]	-0.92 (26.97)	[-53.78, 51.95]	4.18 (1.61)*	[1.03, 7.32]	0.18 (2.37)	[-4.46, 4.82]
Age	0.69 (0.35)†	[0.01, 1.37]	0.02 (0.15)	[-0.28, 0.31]	-0.06 (0.22)	[-0.50, 0.38]	0.01 (0.05)	[-0.08, 0.10]	-0.08 (0.07)	[-0.21, 0.05]
Color Group (Yellow)	-3.35 (11.40)	[-25.69, 18.99]	-0.77 (4.91)	[-10.40, 8.86]	-11.32 (5.13)*	[-21.37, -1.26]	-1.73 (1.52)	[-4.71, 1.24]	-6.11 (2.24)**	[-10.49, -1.73]
Sex (Female)	3.12 (11.96)	[-20.32, 26.55]	17.10 (5.15)**	[6.99, 27.20]	4.25 (5.25)	[-6.04, 14.55]	0.72 (1.59)	[-2.40, 3.84]	6.03 (2.34)*	[1.43, 10.63]
Wristbands duration	8.33 (17.55)	[-26.08, 42.00]	-16.07 (7.57)*	[-30.90, -1.24]	-7.20 (7.77)	[-22.43, 8.04]	-3.17 (2.34)	[-7.75, 1.41]	1.54 (3.44)	[-5.21, 8.29]
Condition (Ritual) * Age	-	-	-	-	0.72 (0.31)*	[0.12, 1.32]	-	-	-	-

Table 4: Linear regression analyses for predictors of the average time participants spent attending to his or her own materials, an in-group peer, an in-group leader, the out-group, or other.
†p < .10, *p <.05, **p < .01

In-Group Peer

Multiple linear regressions were performed to determine the effects of condition on the average amount of time spent looking at an in-group peer. There were no predicted significant effects of age, sex, color group, and the number of days wristbands were worn prior, but these components were retained in the model to control for any variance due to differences in these factors.

There was a significant main effect of condition on the average amount of time spent looking at in-group peers. Children in the control condition spent more time looking at in-group peers (M = 34.82 seconds, SD = 22.80 seconds) than children in the ritual condition (M = 18.67 seconds , SD = 10.45 seconds), see Figure 2. There was also a

significant main effect of sex on the average amount of time spent looking at in-group peers. Females spent more time looking at in-group peers (M = 38.16 seconds, SD = 21.58 seconds) than males (M = 21.40 seconds, SD = 16.29 seconds). There was also a significant main effect of the number of days wristbands were worn prior on the average amount of time spent looking at in-group peers. Children who wore wristbands for 2 days prior (n = 6) spent more time looking at in-group peers (M = 39.33 seconds, SD = 26.12 seconds) than children who wore wristbands for 3 days prior (n = 43, M = 26.30 seconds, SD = 18.92 seconds). See Table 4.

In-Group Leader

Multiple linear regressions were performed to determine the effects of condition on the average amount of time children spent looking at the in-group leader. There were no predicted significant effects of age, sex, color group, and the number of days wristbands were worn prior, but these components were retained in the model to control for any variance due to differences in these factors.

There was a significant interaction between condition and age on the average amount of time children spent looking at the in-group leaders. Overall, children in the ritual condition spent more time looking at the in-group leader (M = 84.67 seconds, SD = 12.06 seconds) than children in the control condition (M = 21.21 seconds, SD = 12.06seconds). However, in the ritual condition, there was an increased average amount of time spent looking at the in-group leader with age. See Figures 2 and 3 and Table 4.

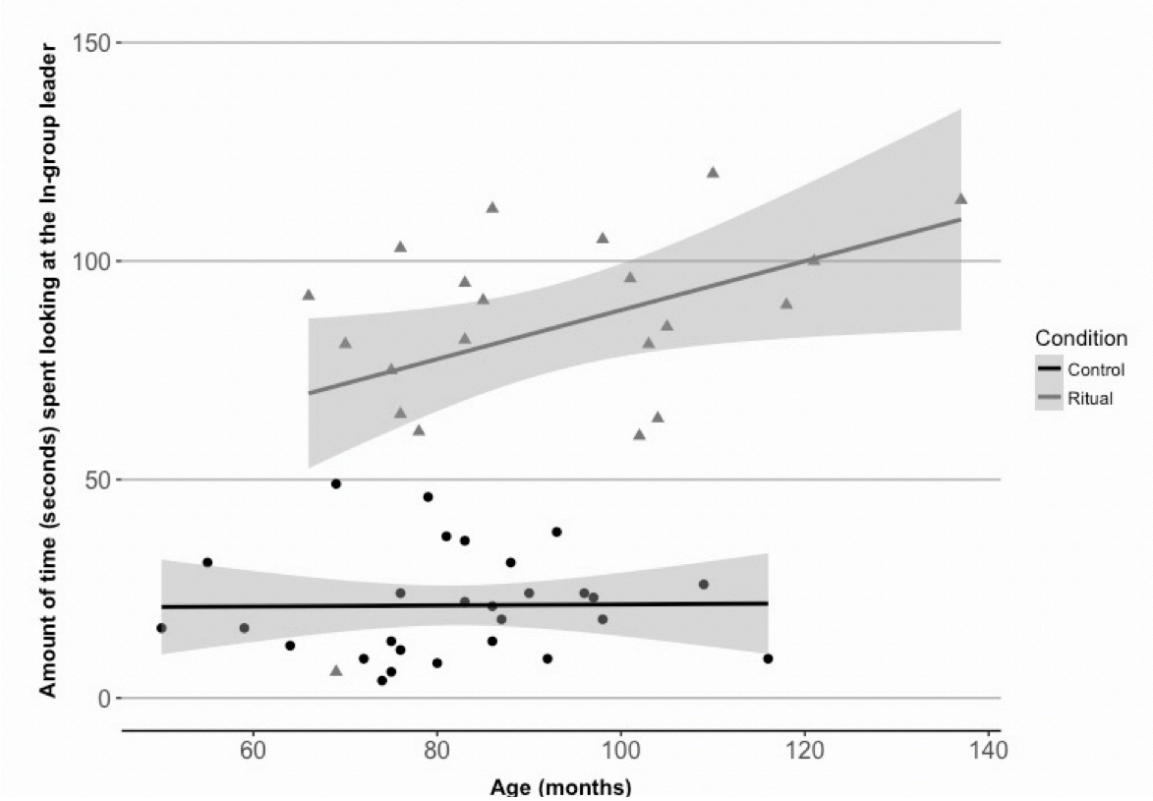

Figure 3: Average amount of time (seconds) spent looking at the in-group leader by condition and age.

Out-Group

Multiple linear regressions were performed to determine the effects of condition on the average amount of time children spent looking at the out-group. There were no predicted significant effects of age, sex, color group, and the number of days wristbands were worn prior, but these components were retained in the model to control for any variance due to differences in these factors.

There was a significant main effect of condition on the average amount of time children spent looking at the out-group. Children in the ritual condition spent more time looking at the out-group ($M = 6.86$ seconds, $SD = 6.08$ seconds) than children in the control condition ($M = 2.93$ seconds, $SD = 4.32$ seconds). See Figure 2 and Table 4.

Other

Multiple linear regressions were performed to determine the effects of condition on the average amount of time children spent looking at things in the 'other' category (not categorized as materials, in-group peer, in-group leader, and out-group). There were no predicted significant effects of age, sex, color group, and the number of days wristbands were worn prior, but these components were retained in the model to control for any variance due to differences in these factors.

There was no significant effect of condition on the average amount of time children spent looking at things categorized as 'other'. Children in the control condition did not spend significantly more or less time attending to objects or people categorized as 'other' (M = 6.61 seconds, SD = 7.06 seconds) than children in the ritual condition (M = 5.05 seconds, SD = 10.44 seconds), see Figure 2. There was a significant main effect of sex on the average amount of time children spent looking at objects or people categorized as 'other'. Females spent more time looking at 'other' (M = 9.53 seconds, SD = 11.73 seconds) than males (M = 3.67 seconds, SD = 4.85 seconds). There was a significant main effect of color group on the average amount of time children spent looking at 'other'. Children in the green group spent more time looking at 'other' (M = 9.24 seconds, SD = 10.86 seconds) than children in the yellow group (M = 2.50 seconds, SD = 2.70 seconds). See Table 4.

Displaying Group Competence Signals

In-Group Leader

Multiple linear regressions were performed to determine the effects of condition on the average amount of time spent displaying materials to the in-group leader. There were no predicted significant effects of age, sex, color group, and the number of days wristbands were worn prior, but these components were retained in the model to control for any variance due to differences in these factors.

There was a significant main effect of condition on the average amount of time spent displaying materials to the in-group leader. Children in the ritual condition spent more time displaying materials to the in-group leader ($M = 5.71$ seconds, $SD = 7.40$ seconds) than children in the control condition ($M = 1.25$ seconds, $SD = 2.80$ seconds), see Figure 4. There was a marginal effect of sex on the average amount of time spent displaying materials to the in-group leader. Males spent marginally more time displaying materials to the in-group leader ($M = 4.33$ seconds, $SD = 6.62$ seconds) than females ($M = 1.32$ seconds, $SD = 3.04$ seconds). See Table 5.

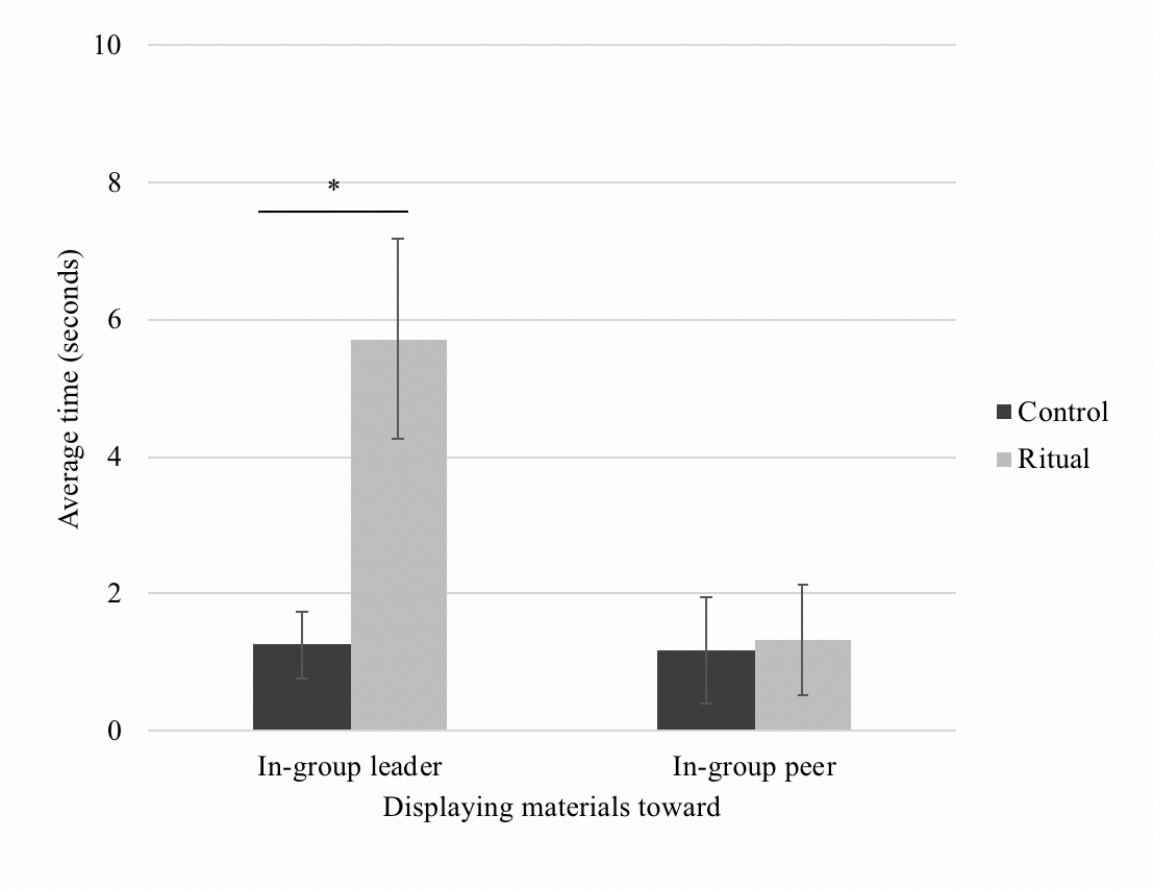

Figure 4: Average amount of time (seconds) spent displaying materials toward the in-group leader and in-group peers by condition. Error bars represent 95% confidence intervals. *$p < .05$

Predictors	In-group leader		In-group peer	
	ß(*SE*)	95% CI	ß(*SE*)	95% CI
Constant	-3.12 (7.51)	(-17.84, 11.50)	-2.08 (2.70)	(-7.37, 3.22)
Condition (Ritual)	3.80 (1.61)*	(-58.11, 162.66)	-0.06 (0.58)	(-1.20, 1.07)
Age	0.04 (0.05)	(-0.05, 0.13)	0.02 (0.02)	(-0.02, 0.05)
Color Group (Yellow)	-1.67 (1.52)	(-4.65, 1.31)	0.89 (0.55)	(-0.18, 1.97)
Sex (Female)	-3.06 (1.59) †	(-6.18, 0.07)	0.33 (0.57)	(-0.80, 1.45)
Wristbands duration	1.16 (2.34)	(-3.43, 5.75)	0.50 (0.84)	(-1.15, 2.15)

Table 5: Linear regression analyses for predictors of the average time participants spent displaying materials to the in-group leader or in-group peer.
† p < .10, *p <.05

In-Group Peer

Multiple linear regressions were performed to determine the effects of condition on the average amount of time spent displaying materials to in-group peers. There were no predicted significant effects of age, sex, color group, and the number of days wristbands were worn prior, but these components were retained in the model to control for any variance due to differences in these factors.

There was no significant main effect of condition on the average amount of time spent displaying materials to in-group peers. Children in the ritual condition did not spent significantly more or less displaying materials to in-group peers (M = 1.18 seconds, SD =

1.98) than children in the control condition (M = 1.33, SD = 1.77), see Figure 4 and Table 5.

DISCUSSION

Little research to date has examined the transmission of ritualistic behavior between young children or the possibility of unique effects of ritualistic behavior on children's social group cognition. This has yet to be fully investigated, in part because the complexity and historical particularity of the world's ritual traditions make it difficult to identify key features of ritualistic behavior and to establish robust generalizations about causes and effects of these features. Furthermore, rituals have been studied almost exclusively with qualitative designs, limiting strong causal inferences about rituals' impact on human cognition and behavior.

Understanding the development of ritual has important implications for understanding cultural learning and the ontogeny of social group cognition (Legare & Watson-Jones, 2015; Watson-Jones & Legare, 2016). While we know that children as young as 3-year-olds old are sensitive to cues to cultural conventions and can distinguish between opportunities to imitate with more or less fidelity (Clegg & Legare, 2016a, 2016b, 2017; Herrmann et al., 2013; Legare et al., 2015; Watson-Jones et al., 2014, 2016). We also know that the experience of participating in a ritual increases in-group affiliation in childhood. Our data demonstrate that when children engage in ritual participation, they show different patterns of attention and displays of group competence signaling compared to children who experience a social group activity alone. These different behavioral profiles may contribute to later increased measures of affiliation with in-group members.

Our data show that there is a tradeoff between what is being attended to in each condition. In the control condition, children spent more time attending to their own task-

related materials as well as their in-group peers when compared to the children in the ritual condition. In the ritual condition, children spent more time attending to the in-group leader, and this attention increases with age in the ritual condition. Learning a novel ritual requires attending to the in-group leader and expert on the group-specific knowledge. As a result, children in the ritual condition would attend more to the in-group leader and less to their in-group peers who are not yet experts on the group-specific ritual, but rather are learning it for the first time. As predicted, there was more concern with out-group activities in ritual condition. This could be due to increased interest and awareness of out-group members in the ritual condition. Perhaps engaging in a group ritual makes group membership more salient to the child, and thus children will be more aware of an out-group presence. There was also no difference in attending to 'other' things that did not fall into the previously described categories. This indicates that across conditions, children spent the majority of their time engaged in their respective tasks (attending to their own materials).

Interestingly, females were more likely to attend to in-group peers than males. This could be an indication of sex differences in motivations and strategies for in-group affiliation, but further empirical studies are necessary to explore this question further. Children who wore wristbands for three days attended less to in-group peers than children who wore wristbands for two days. Perhaps children who had been in their novel groups for one day longer were more familiar with their in-group members and thus grew less curious about them.

As predicted, children in the ritual condition were also more likely to display group competence signals to in-group leaders. However, there was no significant difference between conditions on displaying group competence signals to in-group peers. Children may have prioritized displaying their materials to a higher status in-group leader and expert on group-specific knowledge in order to demonstrate their competence of group-specific

knowledge and identify as a good group member. There were relatively low levels of displaying materials to in-group peers, presumably because all in-group peers had the same level of knowledge of the group-specific activity, so there was no incentive to demonstrate expertise to novices over the expert.

This study showed that engaging in a ritual increased children's awareness of out-group presence and in-group leaders, as well as displays of group competence signals to in-group leaders. It decreased concern with in-group peer activities. These are just some behaviors that may contribute to later self-reported in-group affiliation. This could be related to affiliation with group members when children engage in a novel ritual to a greater degree than group membership alone. I am interested in thinking about other types of behaviors, as well as how these behaviors change over time. These data empirically test the question of whether ritual participation increases in-group affiliation, and does so within an ecologically valid design, using live groups of children engaging in coordinated activities. These results support the proposal that engaging in ritual is a psychologically-prepared, behavioral trademark of our species and that human psychology is thus geared to motivate individuals to engage in behaviors that increase inclusion with their social groups.

This research sheds light on understanding the ontogeny of ritual learning, but we don't yet have a complete picture of the psychological functions of ritual that help solve human adaptive problems associated with group living. Future directions include examining how ritual facilitates cooperation with group members, by empirically examining how engaging in a ritual might aid in achieving coalitional or cooperative goals. Affiliation alone does not lead to cooperation. I would like to understand how engaging in ritual changes children's cooperation with in-group members as well as prosociality towards in and out-group members. Perhaps engaging in a ritual increases group cohesion

and therefore, prosociality toward in-group members, but there could also be factors that contribute to prosociality toward out-group members. This could provide more insight into understanding intergroup conflict.

These future directions tie into another question that examines how ritual promotes high fidelity cultural transmission. Future studies could use transmission chain studies with groups of children to see how they sequentially transmit knowledge to one another in order to examine if ritual in fact allows for more efficient transmission of information between group members. This could additionally facilitate cooperation and cohesion. And finally, I think it is important to examine these behaviors in culturally diverse environments. Future research should seek to answer these questions in places that vary on dimensions of economic, educational and childrearing factors.

Examining the development of ritual behavior has important implications for understanding the emergence of social group cognition in childhood as well as increasing our knowledge of the general human tendency to prefer in-group members to out-group members. In addition, this research provides a new theoretical foundation and innovative methods for understanding ritual, a psychologically understudied yet pervasive feature of human social group cognition and behavior. Beyond the theoretical implications of this research, this work also has the potential to inform our knowledge of intergroup conflict and group interactions in school environments with potential applications to a number of school-related issues, including combatting bullying and prejudice.

Chapter 4:
Smart Conformists: Children and Adolescents Associate Conformity with Intelligence Across Cultures[3]

Children are sensitive to conformity early in childhood. Three- and 4-year-olds are highly attuned to majority views when assessing the reliability of potential informants (Harris & Corriveau, 2011) and prefer to seek and endorse information from majority informants over dissenters (Corriveau et al., 2009). Two- to 4-year-old children are sensitive to peer pressure and conform to erroneous unanimous public judgments (Corriveau, Kim, Song, & Harris, 2013; Haun et al., 2014). Three-year-olds recognize conformity in actors' endorsement of a social norm and enforce norms when they are violated (Schmidt & Tomasello, 2012).

Children engage in high fidelity imitation as a way to conform to and affiliate with social groups (Legare & Nielsen, 2015; Watson-Jones & Legare, 2016). Three to 6-year-olds engage in high fidelity imitation to conform with conventional norms (Clegg & Legare, 2016b; Herrmann et al., 2013; Legare et al., 2015; Watson-Jones et al., 2014, 2016). Children from both Western and non-Western populations (ranging from 2-13-years-old) are high fidelity imitators, frequently conforming with demonstrated behaviors rather than innovating (Berl & Hewlett, 2015; Clegg & Legare, 2016a; Corriveau et al., 2017; Nielsen, Mushin, Tomaselli, & Whiten, 2014; Nielsen & Tomaselli, 2010).

The objective of the current study was to examine cultural variation in children's conformity in the context of imitative fidelity. I define high conformity as high fidelity

[3] Wen, N. J., Clegg, J. M., & Legare, C. H. (2017, in press). Smart conformists: Children and adolescents associate conformity with intelligence early across cultures. *Child Development*. doi: 10.1111/cdev.12935 Wen designed the study, collected the data, conducted the analyses, and wrote the manuscript for publication. Clegg & Legare co-designed the study, advised analyses, and provided feedback on writing of the manuscript.

imitation of a modeled behavior and low conformity as low fidelity imitation of a modeled behavior. Children in both Western and non-Western populations display a robust sensitivity to conformity (Clegg & Legare, 2016a), yet there is variation in the emphasis on conformity versus creativity in children's socialization and education between populations. I investigated whether conformity, or high fidelity imitation, impacts children's and adolescents' reasoning about evaluative traits in Western (U.S.) and non-Western (Vanuatu) populations. I examined the role of conformity in children's and adolescents' judgments of evaluative traits (i.e., intelligence and good behavior) in Vanuatu, a culture that emphasizes conformity in children's behavior, and the U.S., a culture that encourages creativity (Clegg, Wen, & Legare, 2017).

SOCIALIZATION OF CONFORMITY VERSUS CREATIVITY ACROSS CULTURAL CONTEXTS

Socialization in Vanuatu cultivates collective and cooperative goals and encourages social conformity (Dadkah, Harizuka, & Mandal, 1999; Little, Carver, & Legare, 2016; Peck & Gregory, 2005; Strachan, Samuel, & Takaro, 2007; Walker, 2013). Six- to 8-year old children from Vanuatu (Ni-Vanuatu) engage in higher levels of imitative fidelity than U.S. children, potentially due to this variation in cultural expectations for conformity (Clegg & Legare, 2016a). Children's socialization in Vanuatu is consistent with ethnographic research from other non-Western cultures demonstrating that folk concepts of intelligence are associated with conformity (Booth, 2002), obedience (Harkness & Super, 1992), and fulfillment of social responsibility (Serpell, 1993; Sternberg & Grigorenko, 2004; Tobin, Hsueh, & Karasawa, 2009). These behaviors are all seen as more desirable in children than individuality (Azuma & Kashiwagi, 1987; Lutz, 1985; Poole, 1985; Raval, Raval, & Deo, 2014; Serpell, 2011; White, 1985). Adults from non-Western cultures also often identify children's attention to and ability to copy adults' actions as a

social learning strategy and a sign of intelligence (Booth, 2002; Harkness & Super, 1992; McGillicuddy-De Lisi & Subramanian, 1996; Serpell, 1993).

U.S. children are socialized from a young age to be creative and innovative by parents, caregivers, and educators (Harkness et al., 2007; Kim, 1994; Lancy, 2010; Suizzo, 2007). U.S. adults scaffold creativity (i.e., low fidelity imitation) with their children in certain contexts at the expense of high conformity behavior (i.e., high fidelity imitation; Clegg & Legare, 2017). U.S. adults (from Euro-American, higher SES backgrounds) promote self-confidence, independence, assertiveness, and intellectual curiosity in children over obedience and conformity (Lawton, Schuler, Fowell, & Madsen, 1984; Maccoby & Martin, 1983; Raina, 1975; Tobin et al., 2009).

Previous experimental research conducted in the U.S. and Vanuatu support this documented variation in the emphasis of conformity in children's socialization. There is variation in adults' reasoning about the role of conformity—demonstrated by high- and low-fidelity imitation—in assessing children's intelligence (Clegg et al., 2017). U.S. adults were more likely to endorse low conformity U.S. children as intelligent, whereas Ni-Vanuatu adults were more likely to endorse high conformity Ni-Vanuatu children as intelligent. As a comparison, Ni-Vanuatu adults were more likely to endorse high conformity children as well behaved than U.S. adults[4]. Given cultural variation in adults' beliefs, I examined the role of conformity in assessments of competency across development to determine when variation in beliefs about conformity may emerge.

---

[4] In a second study (Clegg et al., 2017), there were no effects of socioeconomic status on U.S. adults' evaluations of conformity. U.S. adults were less likely to endorse high conformity children as intelligent than Ni-Vanuatu adults.

Here I examined the role of conformity in U.S. and Ni-Vanuatu children's and adolescents' judgments of other children's competency and behavior. Our method was based on previous cross-cultural research with adults, using *multivocal ethnography* (Clegg et al., 2017; Tobin et al., 2009). I examined variation in evaluations on conformity in both children and adolescents to assess the development of conformity bias. Adolescence may represent a key period of transition between the conformity bias documented in children's learning and behavior and adults' endorsement of creativity and independence as desirable traits.

Previous research suggests that there is tension between conformity and individuality in adolescence. On one hand, in Western cultures, adolescence is depicted as a period for establishing individual identity, autonomy, independent decision making, and self-reliance (Greenberger, 1982; Steinberg, 1990). Adolescents (12-17-year-olds) are less likely to erroneously conform with a majority than children (3-11-year-olds) when the accuracy of the conformity judgment is unambiguous (Walker & Andrade, 1996). On the other hand, peer conformity to antisocial, prosocial, and neutral behaviors peaks at early and mid-adolescence (11-15-years-old), but decreases in later adolescence (16-17-years-old) (Berndt, 1979). Adolescents also engage in conformity when participating in desirable risk-taking behavior, potentially as a means of affiliation with peer groups (Ennett et al., 2006; Gardner & Steinberg, 2005). This may be attributed to sensation seeking and lack of impulse control (Steinberg & Cauffman, 1996). Notably, previous research on adolescent conformity has been conducted almost exclusively with Western populations. Examining the relations between conformity and Ni-Vanuatu adolescents' judgments of peers also contributes to the development of a more comprehensive understanding of cultural variation in beliefs about conformity.

Evaluative traits are used to reason about and predict the behavior of others (Alvarez, Ruble, & Bolger, 2001; Heyman, Gee, & Giles, 2003; Heyman & Giles, 2004). Children link task performance and effort to intelligence, though this link decreases with age (Heyman et al., 2003; Kun, 1977; Nicholls & Miller, 1984). I chose to examine conceptions of intelligence and good behavior because they are evaluative traits (i.e., traits that tend to be value-laden or socially desirable) (Heyman & Giles, 2004), which can be assessed from observable behaviors over self-report in 10- and 11-year-olds (Heyman & Legare, 2005). Rather than rely on participants' descriptions of the traits, I used a methodology relying on assessments of children's observed behavior. I intentionally used two different evaluative traits, intelligence and good behavior, to ensure I was examining the relations between conformity and these traits and not an overall preference for high conformity. Thus, it is possible that if conformity is viewed as effortful, it could be interpreted as requiring greater intelligence. It is also possible, however, that conformity may not be an indicator of effort, but rather an indicator of task difficulty. In this case, children would view high conformity as a sign of a lack of understanding or task difficulty, which is not associated with intelligence (Kun, 1977; Nicholls & Miller, 1984).

I examined whether beliefs about competency and behavior varied depending on whether participants were watching children from their in- or out-group. Children's and adolescents' beliefs about traits of children from their own cultural group or a comparison group were assessed. Children and adolescents from both populations watched videos of children engaging in high and low conformity behavior (i.e., engaging in high or low fidelity imitation of an adult's necklace-making demonstration) and were asked to evaluate which child was intelligent and which was well behaved and to explain their choices. Participants were shown videos from either their own or a comparison cultural group to

assess whether their conformity evaluations could be generalized beyond their own cultural group.

I hypothesized that cultural differences in the value of conformity versus creativity in the U.S. and Vanuatu may impact evaluations of children's intelligence and good behavior. Consistent with previous findings examining adults' beliefs (Clegg et al., 2017), I predicted that U.S. children and adolescents would be more likely than Ni-Vanuatu children and adolescents to endorse the low conformity child as intelligent and well-behaved, reflecting a cultural preference for creativity and individuality that is socialized starting at a young age. U.S. adults are more likely to endorse the U.S. low conformity child as intelligent and the U.S. and Ni-Vanuatu low conformity children as well-behaved. I predicted that endorsing the low conformity child would increase with age in the U.S. (e.g., adolescents would be more likely than children to endorse the low conformity child). Ni-Vanuatu adults endorsed the Ni-Vanuatu high conformity child as intelligent and the U.S. and Ni-Vanuatu high-conformity children as well-behaved. I predicted there would be no age-related differences between children and adolescents in Vanuatu, reflecting a pervasive cultural preference for collective and cooperative values.

METHOD

Participants

Participants ($N = 256$) in the U.S. and Vanuatu were recruited from two age groups, 128 children (6-11-year-olds) and 128 adolescents (13-17-year-olds) from March 2013-December 2014.

Tanna, Tafea Province, Vanuatu

Vanuatu, a Melanesian archipelago, consists of 65 islands, with high levels of linguistic and cultural diversity. Our study was conducted in Tanna, Vanuatu, the most

highly populated island in the Tafea Province. The total population of Tanna is 28,800 inhabitants. Most adults have not participated in formal education beyond primary school and families engage in subsistence agriculture. Between 2008-2012, 72% of children completed primary school, 36% of children attended some secondary school, and 83% of the adult population was literate (UNICEF, 2013).

One-hundred twenty-eight individuals were recruited from Vanuatu, 64 children (26 females; M_{age}= 8-years-old, *range* = 6-11-years-old) and 64 adolescents (38 female; M_{age}= 15-years-old, *range* = 13-17-years-old). Ni-Vanuatu children were recruited from 1st, 2nd, and 3rd year classrooms in primary schools in Lenakel and Isingel, Tanna, Vanuatu. Adolescents were recruited from classrooms in a secondary school in Lenakel. Based on conversations with school officials and local Peace Corps volunteers, I recruited participants from these classrooms because these students tended to be between 6- and 11-years-old and 13- and 17-years-old. When possible, I obtained birthdate information from teachers and school officials. If exact birthdate information was not available for Ni-Vanuatu participants, I gathered participants' ages in years. Age information was not known for seven children in the Ni-Vanuatu sample. For analysis purposes, I input the average age of the children in the same classroom as the missing value. When comparing those models to a model where those seven participants were removed from the analyses, I did not find any differences when examining significant predictors.

Children and adolescents were from families that were employed in a variety of subsistence living and tourism activities and their parents typically had limited exposure to Western education beyond primary or limited amounts of secondary school. Sample size was determined prior to data collection in Vanuatu based on anticipated limited access to participants. Our sample included all of the school-aged children in the village, which I then matched the useable number of participants with the adolescents for comparison. Data

from 11 additional participants were dropped due to experimenter error (n = 8) and the participant electing to stop the study (n = 3). I was highly stringent in our inclusion criteria and worked with a local research assistant to translate the content of each experimental session.

Austin, Texas, United States

One-hundred twenty-eight individuals participated in the U.S., 64 children (35 female; M_{age}= 9 years, 0 months; *range* = 6 years, 0 months to 11 years, 11 months) and 64 adolescents (35 female; M_{age}= 15 years, 10 months; *range* = 12 years, 11 months to 17 years, 11 months). U.S. children and adolescents were recruited from a participant database at a research university and from a local children's museum. Participants were primarily Euro-American and from middle- to high-socioeconomic status families. Sample size was selected to match the number of participants tested in Vanuatu.

Procedure and Coding

In the U.S., testing was conducted in English in a quiet room in the university children's research lab or in a quiet office at the children's museum. In Vanuatu, testing was conducted in a quiet room or secluded outdoor area in each of the recruitment locations. The study protocol was translated into Bislama (one of the official languages of Vanuatu) and back translated into English by two Ni-Vanuatu teachers with high English proficiency. Two female Ni-Vanuatu research assistants were recruited from local villages and were extensively trained by the first author on how to execute the protocol. I was present for all studies in Vanuatu. All studies were transcribed and translated back to English to ensure compliance with the experimental protocol.

Video Demonstration

Using a between-subjects design, participants were assigned to one of two video country conditions (same country video or different country video) and one of two conformity framing conditions (low or high). In the same country video condition, participants saw videos of actors from the same country as themselves (i.e., U.S. participants saw U.S. actors; Ni-Vanuatu participants saw Ni-Vanuatu actors). In the different country video condition, participants saw videos of actors from a different country from themselves (i.e., U.S. participants saw Ni-Vanuatu actors; Ni-Vanuatu participants saw U.S. actors). Over the course of the experimental session, each participant watched three videos – one of the adult demonstrator and a video of a high conformity child and a video of a low conformity child. Actor nationality was kept constant throughout the experimental session, so participants either only saw videos of Ni-Vanuatu actors or U.S. actors.

At the beginning of each experimental session, the following words appeared on the screen (and the research assistant read them aloud as well), "I am going to show you some videos from the U.S." or "I am going to show you some videos from Vanuatu." In the U.S., an extra slide was read that clarified where Vanuatu was on a map (since many participants were unfamiliar with the country), and the RA read, "Vanuatu is a group of islands in the South Pacific." Because all Ni-Vanuatu participants were familiar with where the U.S. was, there was no need to clarify with a map.

The slide then read, "Two children watch an adult demonstrate something new. Before the adult shows the children something new, she says…" At this point, the participants were presented with one of two frames for the task – the high conformity frame, "'Everyone always does it like this. Let's watch what I'm doing. Everyone always does it like this." or the low conformity frame, "I'm going to make a necklace. Let's watch what I'm doing. I'm going to make a necklace." These two different frames varied in cues

to conformity and were used in order to ensure that the instructions given to the children in the videos about the task did not influence participants' judgments. The words then read, "Now you'll watch the adult." Participants watched a video of an adult actor (a U.S. or Ni-Vanuatu female actor) demonstrating a necklace-making sequence while engaging in both causally relevant and irrelevant actions. This necklace-making task has been used in past research examining the impact of culture on children's imitative behavior as a tool for social learning and has been validated as a task that represents typical social learning situations in both the U.S. and Vanuatu (Clegg & Legare, 2016a, 2016b).

The actor sat in front of a set of necklace-making materials (a plastic placemat with one row of 3 circle beads in front of a row of 3 square beads in front of two folded strings) on the table (see Figure 5). The actor began the sequence by looking down and picking up one of the strings. She held one end of the string in each hand, stretched the string into a straight line, and then brought the ends back together in front of her. Next she repeated this action once more before stretching the string into a straight line and placing it in front of the tray (the side closest to the child) and removing both of her hands. She then picked up a circle bead and touched it to her forehead before stringing it on the right side of the string and moving the bead to the middle of the string. She repeated this sequence for a square bead and a circle bead. After the experimenter placed the last bead on the string, she picked one end of the string up in each hand, held the necklace up, and smiled.

Component of action sequence	Description of model's (M) behavior	Ni-Vanuatu Model	U.S. Model
1. Stretch string	M brings the ends of the string together and then opens it twice.		
2. Place string	M lays the string out on the table above the tray.		
3. Three bead to forehead touches	M touches the purple, yellow, & green beads to forehead before placing them on the string.		
4. Circle, square, circle	M's necklace consists of three beads in order– a circular bead, a square bead, and a circular bead.		
5. Three beads	M's necklace consists of only three beads.		

Figure 5: Video demonstrations of adult models in the U.S. and Vanuatu.

Participants were told, "Now you'll watch Child 1" and then watched a video of a girl completing the necklace making sequence with the same objects as the adult. Participants were then told, "Now you'll watch Child 2" and watched a video of another girl completing the necklace making sequence with the same objects as the adult. The videos of the children were taken from previous studies using the necklace-making task, so the behaviors were naturally occurring, rather than scripted videos. Videos of children from both cultures were matched on child age, the length and the types of the behaviors that the high and low conformity children displayed. One girl imitated the adult with higher

fidelity, engaging in all the same actions as the adult (high conformity child). The other girl eliminated the causally irrelevant actions (did not stretch the string and did not touch the beads to her forehead) and put all of the beads on the string (low conformity child). The same videos were used for all participants (participants who watched the U.S. videos saw the same two U.S. girls each time; participants who watched the Ni-Vanuatu videos saw the same two Ni-Vanuatu girls each time). Video order (high versus low conformity child first) was counterbalanced. The current study uses the same method as Clegg, Wen, & Legare (2017).

Preference for Conformity Measure

After watching the videos, participants were told "Remember what the adult told the children - Everyone always does it like this. Let's watch what I'm doing. Everyone always does it like this." or "Remember what the adult told the children – I'm going to make a necklace. Let's watch what I'm doing. I'm going to make a necklace." The participants were then asked to indicate "Which one is smart?" and "Which one is well-behaved?". Participants were asked to choose one of the children. Participants' responses were coded as a 1 (endorsing the high conformity child) or a 0 (endorsing the low conformity child).

Explanations

Following each question, the participants were asked why they made their selection for the smart and well-behaved question. Using both the forced choice measure (a selection between the high conformity and low conformity child) and an open explanation measure allowed us to assess each participants' use of conformity as a factor in their decision and their justification of their choice. Explanations were coded for the participant's justification for choosing the child that they indicated and any additional content (e.g., explaining why

the other child might also be considered smart or well-behaved) was not coded. Participants' explanations for why they selected the specific child were coded into two categories: conformity and creativity. Conformity explanations included those in which the participant mentioned that the child followed the directions, copied the adult, engaged in a specific action modeled by the adult, paid attention to what the adult did, or knew how to complete the task (e.g., "She was able to completely duplicate the adult's actions" or "She watched the teacher and made the same"). This category also included normative judgments (e.g., "She made it well" or "She made it right"). Creativity explanations included those in which the participant mentioned that the child displayed creativity or indicated that the child displayed behavioral variation such as mentioning a specific action the child did that was different from the adult's (e.g., "[Child 2] shows thinking on her own and outside of the box, not doing what everyone else does" and "She used all of the beads").

RESULTS

Overview of Analyses

Preference for Conformity Measure

Binary logistic regressions were performed to test the effects of participant country and age on preference for conformity (i.e., the likelihood that participants selected the high conformity child) for each question. All predictor variables were standardized, so odds could be interpreted as the odds of selecting the child who imitated with higher fidelity over the child who imitated with lower fidelity for a one standard deviation change in a predictor variable (see Table 6). The logistic regression model was fit to a probit curve due to cell size (n = 16 per cell).

Since age information was not known for seven children in the Ni-Vanuatu sample, I input the average age of the children in the same classroom as the missing value for

analyses purposes. I compared these models to a model where those same participants were removed from the analyses and did not find any differences when examining significant predictors.

	Evaluation of Child					
	Smart			*Well-Behaved*		
Predictors	*β (SE)*	*OR*	*95% CI*	*β (SE)*	*OR*	*95% CI*
Intercept	0.66 (0.36)†	1.94	[0.96 – 3.94]	-0.80 (0.36) *	0.45	[0.22 – 0.91]
Participant Country (U.S.)	0.55 (0.19) **	1.74	[1.19 – 2.54]	1.19 (0.21) ***	3.30	[2.20 – 4.96]
Age (years)	-0.01 (0.03)	0.99	[0.94 – 1.04]	0.09 (0.03) ***	1.10	[1.04 – 1.15]
Video Country (same)	-0.04 (0.19)	0.96	[0.66 – 1.39]	-0.09 (0.19)	0.91	[0.63 – 1.33]
Conformity Framing (high)	0.21 (0.19)	1.23	[0.85 – 1.79]	0.29 (0.19)	1.33	[0.92 – 1.94]
Video Order (low-high)	0.15 (0.19)	1.16	[0.80 – 1.69]	-0.11 (0.19)	0.90	[0.62 – 1.31]

Table 6: Binary logistic regression analyses for predictors of preference for conformity by question.
†$p<.10$, *$p < .05$, **$p < .01$, ***$p < .001$

Explanations

Binary logistic regressions were performed to test effects of participant country, age, and preference for conformity (i.e., the likelihood that participants selected the high conformity child) on the likelihoods of giving a conformity explanation and a creativity explanation in evaluating intelligence and in evaluating good behavior. All predictor variables were standardized, so odds could be interpreted as the odds giving the explanation for a one standard deviation change in a predictor variable (see Table 7).

Explanation Type	Predictors	*Evaluation of Child*					
		Smart			*Well-Behaved*		
		β (SE)	*OR*	*95% CI*	*β (SE)*	*OR*	*95% CI*
Conformity	Intercept	-3.33 (0.54)***	0.04	[0.01 – 0.10]	-0.63 (0.68)	0.53	[0.14 – 2.01]
	Preference for Conformity (high)	2.25 (0.31)***	9.47	[5.16 – 17.37]	-0.26 (0.75)	0.77	[0.18 – 3.36]
	Participant Country (U.S.)	1.03 (0.21)***	2.79	[1.84 – 4.25]	0.53 (0.18)**	1.70	[1.19 – 2.44]
	Age (years)	0.12 (0.03)***	1.13	[1.07 – 1.20]	-0.04 (0.06)	0.96	[0.85 – 1.09]
	Video Country (same)	0.21 (0.21)	1.23	[0.82 – 1.84]	-0.01 (0.18)	0.99	[0.70 – 1.39]
	Conformity Framing (high)	-0.05 (0.21)	0.95	[0.64 – 1.43]	0.18 (0.18)	1.20	[0.85 – 1.69]
	Video Order (low-high)	0.17 (0.21)	1.18	[0.79 – 1.77]	-0.37 (0.18)*	0.69	[0.49 – 0.98]
	Preference for Conformity (high) * Age (years)	-	-	-	0.13 (0.07)*	1.14	[1.00 – 1.31]
Creativity	Intercept	-0.96 (0.78)	0.38	[0.08 – 1.75]	-1.19 (0.66)†	0.30	[0.08 – 1.10]
	Preference for Conformity (high)	-3.36 (0.60)***	0.03	[0.01 – 0.11]	-5.45 (270.86)	0.00	[0.00 –1.56e^{228}]
	Participant Country (U.S.)	0.20 (0.40)	1.22	[0.56 – 2.66]	-0.67 (0.60)	0.51	[0.16 – 1.64]
	Age (years)	0.09 (0.05)	1.09	[0.98 – 1.22]	0.05 (0.05)	1.05	[0.95 – 1.17]
	Video Country (same)	-0.60 (0.40)	0.55	[0.25 – 1.19]	0.01 (0.37)	1.01	[0.49 – 2.10]
	Conformity Framing (high)	1.12 (0.47)*	3.07	[1.22 – 7.73]	-0.20 (0.39)	0.82	[0.38 – 1.74]
	Video Order (low-high)	-0.72 (0.40)†	0.49	[0.22 – 1.06]	0.15 (0.38)	1.16	[0.05 – 2.44]

Table 7: Binary logistic regression analyses for predictors of explanation type in evaluating intelligence and good behavior.
†$p<.10$, *$p < .05$, **$p < .01$, ***$p < .001$

Analyses

There were no significant effects of video country (same or different), conformity framing (high or low), or video order (high or low conformity child first) for participants' preference for conformity and explanations for either question but these components were retained in both models to control for any variance due to differences in these variables (see Tables 6 and 7).

Smart

Preference for Conformity

When asked "Which one is smart?", there was a significant main effect of participant country on preference for conformity. This indicates that U.S. participants were more likely to endorse the high conformity child as intelligent ($M = 0.90$, $SD = 0.30$) than Ni-Vanuatu participants ($M = 0.77$, $SD = 0.43$) (*odds ratio* = 1.74). There was no main effect of age, video country, conformity framing, or video order. See Table 6 and Figure 6.

Further analyses revealed that all groups' responses differed from chance. U.S. children's responses were significantly different from chance, ($X^2 = 49.00, df = 1, p < .001$), as were Ni-Vanuatu children's responses ($X^2 = 14.06$, $df = 1$, $p < .001$), U.S adolescents' responses ($X^2 = 33.06, df = 1, p < .001$), and Ni-Vanuatu adolescents' responses ($X^2 = 22.56$, $df = 1, p < .001$).

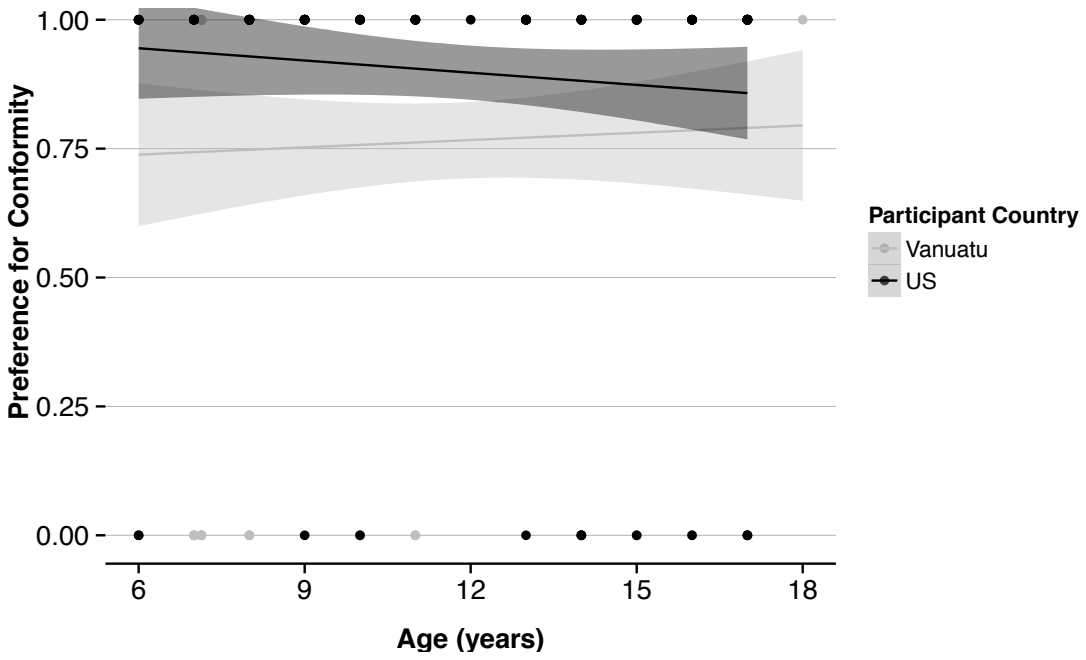

Figure 6: Preference for conformity in evaluating intelligence by participant country and age.

Conformity Explanations

There was a significant main effect of preference for conformity, participant country, and age on the likelihood of giving a conformity explanation. This indicates that participants endorsing the high conformity child ($M = .81$, $SD = .39$) were more likely to give a conformity explanation than those endorsing the low conformity child ($M = 0.12$, $SD = 0.32$) (*odd's ratio* = 9.47). U.S. participants were more likely to give a conformity

explanation ($M = .85$, $SD = 0.36$) than Ni-Vanuatu participants ($M = .54$, $SD = 0.50$) (*odd's ratio* = 2.79). As participants increase in age, they were more likely to give a conformity explanation (*odd's ratio* = 1.13). There was no main effect of video country, conformity framing, or video order. See Table 7.

Creativity Explanations

There was a significant main effect of preference for conformity and conformity framing on the likelihood of giving a creativity explanation. This indicates that participants endorsing the low conformity child ($M = .49$, $SD = .51$) were more likely to give a creativity explanation than those endorsing the high conformity child ($M = 0.00$, $SD = 0.07$) (*odd's ratio* = 0.03). Participants who received the high conformity framing ($M = .09$, $SD = 0.29$) were more likely to give a creativity explanation than those who received the low conformity framing ($M = .08$, $SD = 0.27$) (*odd's ratio* = 3.07). There was no main effect of age, participant country, video country, or video order. See Table 7.

Well-Behaved

Preference for Conformity

When asked "Which one is well-behaved?", there was a significant main effect of participant country and age on preference for conformity. This indicates that U.S. participants were more likely to endorse the high conformity child ($M = .92$, $SD = 0.27$) in evaluating good behavior than Ni-Vanuatu participants ($M = .62$, $SD = 0.49$) (*odds ratio* = 3.30). As participants increase in age, they are more likely to endorse the high conformity child as well-behaved (*odd's ratio* = 1.10). There was no main effect of video country, conformity framing, or video order. See Table 6 and Figure 7.

Further analyses revealed that Ni-Vanuatu children's response did not differ from chance $X^2 = 0.06$, $df = 1$, $p = ns$. However, U.S. children's responses were significantly

different from chance, ($X^2 = 36.00$, $df = 1$, $p < .001$), as were U.S adolescents' responses ($X^2 = 56.25$, $df = 1$, $p < .001$), and Ni-Vanuatu adolescents' responses ($X^2 = 12.25$, $df = 1$, $p < .001$).

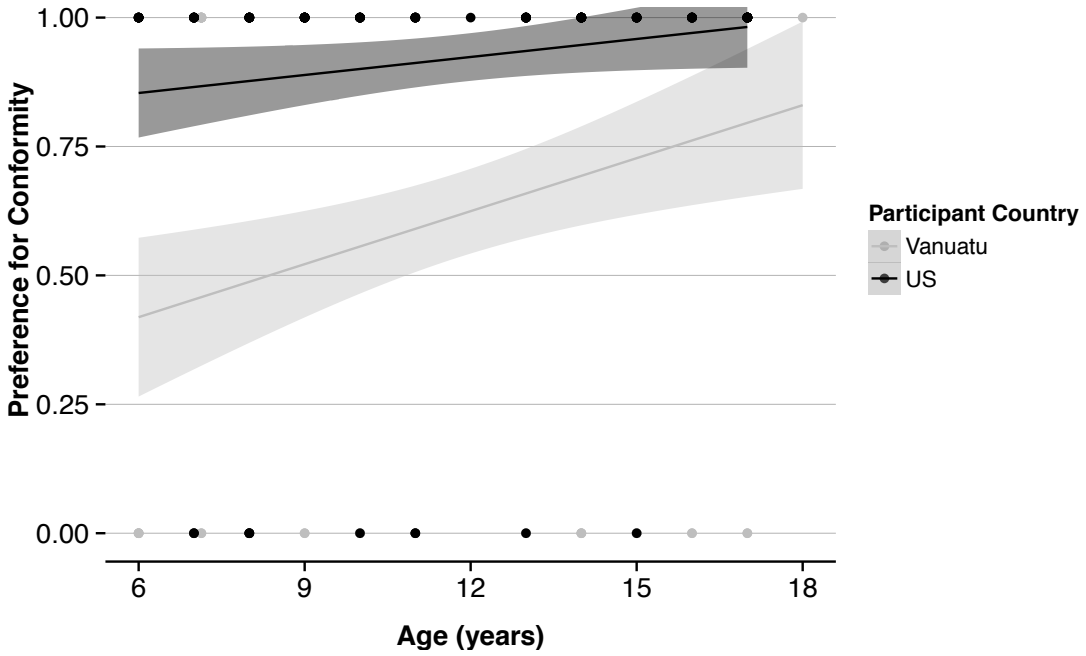

Figure 7: Preference for conformity in evaluating good behavior by participant country and age.

Conformity Explanations

There was a significant main effect of participant country and video order, as well as a significant interaction between preference for conformity and age. This indicates that participants endorsing the high conformity child ($M = .69$, $SD = 0.47$) were more likely to give a conformity explanation than those endorsing the low conformity child ($M = .15$, $SD = 0.36$) when controlling for age (*odd's ratio* = 1.14). In other words, when endorsing the high conformity child, participants were more likely to give a conformity explanation with age, but when endorsing the low conformity child, participants were less likely to give a

conformity explanation with age. This also indicates that U.S. participants were more likely to give a conformity explanation (M = .71, SD = 0.45) than Ni-Vanuatu participants (M = .41, SD = 0.49) (*odd's ratio* = 1.70). This also indicates that participants were more likely to give a conformity explanation if they saw the high conformity video first (M = .63, SD = 0.49) than if they saw the high conformity video last (M = .50, SD = 0.50) (*odd's ratio* = 0.69). There was no main effect of preference for conformity, age, video country, or conformity framing. There were also no other significant interactions. See Table 7.

Creativity Explanations

There were no significant effects of preference for conformity, participant country, age, video country, conformity framing, or video order on the likelihood of giving a creativity explanation. See Table 7. This is likely due to the overall low levels of giving a creativity explanation (5.47% of participants) and of endorsing the low conformity child (22.27% of participants).

DISCUSSION

Despite children's well-documented early developing sensitivity to conformity, there has been little systematic research about whether children and adolescents use conformity in their evaluative judgments of others. Even less is known about how this may differ across cultures that vary in emphasis on creativity versus conformity in children's behavior. In the present study, I used a multivocal paradigm (Clegg et al., 2017) to examine the relations between creativity and conformity and children's and adolescents' judgments of peers' competency and behavior in a Western cultural context that values creativity and a non-Western cultural context that values conformity. Across both populations, children and adolescents associated conformity with both intelligence and good behavior.

Ni-Vanuatu children's and adolescents' endorsement of the high conformity child as intelligent and well-behaved is consistent with our predictions and with previous ethnographic evidence of what constitutes intelligence in collectivist cultures. A child is considered intelligent if they can learn by watching adults and conforming with the demonstrated behavior (Booth, 2002). This is also consistent with findings that Ni-Vanuatu adults are more likely to endorse high conformity children from their in-group as intelligent and high conformity children from both their in- and out-groups as well-behaved (Clegg et al., 2017).

In contrast, U.S. children's and adolescents' endorsement of the high conformity child as intelligent is inconsistent with our prediction that U.S. children and adolescents would endorse the low conformity child as intelligent and that this effect would increase with age. This is also in stark contrast to findings that U.S. adults evaluate low conformity children as intelligent and were less likely than Ni-Vanuatu adults to endorse high conformity children as well-behaved (Clegg et al., 2017). Our data demonstrate that participants endorsed the high conformity child as more well-behaved and intelligent across age groups and populations. This effect was stronger among U.S. than Ni-Vanuatu participants (for good behavior and intelligence) and among adolescents than children (for good behavior). A potential explanation for these results is that conformity bias among children and adolescents outweighs adults' judgments about intelligence and conformity and cultural narratives concerning individualism and creativity in the U.S. (Harkness et al., 2007; Lancy, 2010).

Participants' explanations for their choices were consistent with their endorsements and provided converging evidence for the role of conformity in judgments of intelligence and good behavior. In evaluating intelligence, participants across both populations who endorsed the high conformity child were more likely to give conformity explanations (e.g.,

"[She] followed what the teacher did.") and those who endorsed the low conformity child were more likely to give creativity explanations (e.g., "do their own thing" or "think outside the box"). Older participants were more likely to give a conformity explanation in evaluating intelligence. In evaluating good behavior, U.S. and Ni-Vanuatu participants who endorsed the high conformity child were more likely to give a conformity explanation with age, but those who endorsed the low conformity child were less likely to give a conformity explanation with age. Thus, for both traits, participants' explanations were consistent with their judgments and indicated behavioral conformity was associated with competency and behavior. The frequency of verbally expressing this association increased with age. In evaluating both intelligence and good behavior, U.S. participants were more likely to give conformity explanations than Ni-Vanuatu participants. Children and adolescents had a strong preference for conformity across populations regardless of the framing of the task as requiring high or low conformity. The lack of effect of task framing indicates that the participants are evaluating children's conformity behavior in relation to intelligence.

Participants did not differ in their evaluations of children from their own cultural group versus a different cultural group. There is substantial evidence that social group cognition develops early in human ontogeny (Rhodes, 2012; Watson-Jones & Legare, 2016; Watson-Jones et al., 2016) and that placing young children in novel social groups activates in-group biases (Dunham et al., 2008; Nesdale & Flesser, 2001; Wen et al., 2016). Other research, however, has found that children demonstrate a preference for consensus (when learning information from an in- or out-group member) while learning new information (Chen, Corriveau, & Harris, 2013). Our data suggest that children's and adolescents' preferences for consensus outweigh preferences for in-group members in assessing evaluative traits. Additional research should expand upon our assessment of

intelligence and good behavior to examine other psychological traits that could vary developmentally and cross-culturally. Future research should also examine the mechanisms by which certain traits are socialized and how these cultural narratives are transmitted between generations.

U.S. children's and adolescents' endorsement of high conformity children as intelligent and well-behaved reveals a tension between conformity bias and the U.S. emphasis on individuality and creativity. Ethnographic and psychological research (Clegg & Legare, 2016a; Clegg et al., 2017; Kim, 1994; Suizzo, 2007) demonstrate that individualism, innovation, and creativity are highly valued among U.S. adults. There may be a tension between the messages that children and adolescents are hearing from adults about creativity and how their success in school and other pursuits is determined. Schools may be reinforcing behavioral conformity, as they are imperfect vehicles of cultural values and beliefs (Tobin et al., 2009). Thus, cultural narratives encouraging creativity and innovation are inconsistent with children's early-developing and heavily reinforced conformity bias. It may not be until post-secondary school that U.S. young adults gain exposure to non-conformists perceived as intelligent, who may have more opportunity to succeed outside of the constraints of the conventional U.S. classroom.

Our results demonstrate the importance of theoretically-motivated cultural comparisons. I chose the U.S. and Vanuatu due to differences in the degree to which they represent globally typical child-socialization environments and because of the variation in the cultural narratives about conformity and creativity. There are cross-cultural differences in adults' beliefs about the relations between conformity and intelligence (Clegg et al., 2017) not evident in judgments from children and adolescents. The lack of cultural variation in judgments early in development demonstrates the importance of studying a wide age range when conducting cross-cultural research (Legare, 2017; Nielsen et al.,

2017). There are very few experimental studies examining conformity that span age groups, utilizing the same paradigm. To our knowledge, this is the first cross-cultural study to examine how an early-developing conformity bias interacts with cultural narratives to impact how children and adolescents reason about others.

In this study, high fidelity imitation was used as a measure of conformity. There are, however, many different kinds of conformity, such as conformity to conventional norms (Schmidt & Tomasello, 2012; Watson-Jones et al., 2016), majority judgments (Corriveau et al., 2009, 2013; Harris & Corriveau, 2011), majority actions (Asch, 1956; Haun et al., 2014; Herrmann et al., 2013; Walker & Andrade, 1996), and obedience (Berndt, 1979). Future research could examine the role of different kinds of conformity on reasoning about others. In interpreting the generalizability of our data, it is also critical to consider the geographic limitations of the sampling. Because this study is limited to a sample from one island in Vanuatu and from one city in the U.S., it is necessary to be cautious about generalizing these findings outside of the contexts in which they were collected. Future studies should explore these questions in populations (both Western and non-Western) that vary in other aspects of child socialization goals.

Developmental science has revealed that children have an early sensitivity to conformity. Our data demonstrate that conformity bias overrides cultural beliefs about creativity as indicative of intelligence in U.S. children and adolescents. In the U.S. and Vanuatu, children and adolescents demonstrate similar levels of conformity bias when evaluating peers' intelligence and behavior, despite differences in cultural narratives emphasizing creativity versus conformity. Our results have implications for using cross-cultural comparison to re-evaluate our understanding of the interplay of conformity bias and trait psychology.

Chapter 5: Conclusions, Implications, and Future Directions

By studying the emergence of collective rituals in early childhood, we gain insight into understanding the ontogeny of social group cognition. This dissertation overviews how children identify and acquire ritual through imitation. Children are highly sensitive to cues to collective rituals and use them to determine when there is an opportunity for imitation. This dissertation provides evidence that engaging in a collective ritual increases children's affiliation with in-group members above and beyond group membership alone. It also provide evidence that evaluations of conformity to a ritual differ cross-culturally. This dissertation supports the proposal that humans are psychologically prepared to engage in collective rituals as a means of in-group affiliation to prevent the threat of group ostracism. This interdisciplinary and cross-cultural research has been designed to provide an innovative developmental and mixed-methodological approach to studying cultural learning.

Chapter 2 examined the impact of ritual participation on children's in-group affiliation. The results support the hypothesis that ritual increases in-group affiliation. The experience of participating in a ritual increases children's self-reported in-group affiliation to a greater degree than group membership alone, when you account for the amount of experience with a social group activity. It is important here that the comparison is between ritual participation and group membership alone. While group membership is a powerful mechanism for affiliation alone, it is the act of participating in a ritual that further increases affiliation above and beyond group membership. Furthermore, ecological validity was high because the same children received repeated exposure to a social group activity throughout a two-week period and remained marked in a novel social group throughout this period.

While the results in Chapter 2 provide empirical evidence for the effects of ritual participation on children's self-reported in-group affiliation, more research is needed to understand the behaviors that lead to these feelings of in-group affiliation. What is it about participating in a collective ritual that increases in-group affiliation? Do rituals help identify group members more saliently? Do rituals help demonstrate commitment to the group? More research is needed to experimentally manipulate different features of ritual to examine the effect of ritual on psychological outcomes. This study combined many features of ritual (group coordination, behavioral synchrony, conventional language, etc.), thus the extent to which the individual features of ritual contribute to increasing in-group affiliation should be examined in future research.

Chapter 3 examined the impact of ritual participation on children's group behavior towards in- and out-group members. The results demonstrate that engaging in novel ritual participation increases awareness of out-group members, attention toward in-group leaders, and increased displays of group competence signaling toward in-group leaders. These data speak to the tradeoff in what children engage in when they are presented with a collective ritual versus a control task. The results support that children are mindful of who to attend to when learning a ritual and attend to the expert and knowledgeable in-group leader. Children who participate in a group ritual also have piqued interest in the out-group, which may indicate that ritual participation makes group identity and status more salient to the individual. Children who engaged in a ritual also were more likely to display competence signals to in-group leaders. Children may prioritize displaying their group ritual to the in-group leader in order to display their knowledge of group-specific information. This action may serve to help individuals identify as group members and to demonstrate group commitment.

The behaviors examined in Chapter 3 are just a few of the behaviors that children may engage in which later contribute to group affiliation. To fully understand the relationship between ritual and social group cohesion, more assessment of behaviors between in-group members, out-group members, and group leaders are necessary. For example, to further understand ritual transmission in a group, one could examine what information children transmit to their peers over time. It would also be interesting to examine if children correct the specific steps of the ritual that other in-group members perform, in order to foster the longevity of the ritual and thus, the social group. It would also be important to understand how ritual may facilitate cooperation with group members, by further examining the types of behaviors in-group members engage in, and also observe how in- and out-group members interact outside of the scaffolded social group activity.

Furthermore, there were some sex differences in behaviors that children engaged in during the social group activity. Females were more likely to attend to their in-group peers than males. And males were more likely than females to display their group competence signals to in-group leaders. While I do not believe that there are sex differences in the overall drive to affiliate with group members, I do believe that certain aspects of affiliation can look different in males and females. Future research should investigate sex differences as it pertains to acquiring and transmitting rituals. Coming of age rituals and rituals celebrating an individual entering puberty differs for males and females. It would be interesting to understand if affiliation varies, in the level of which it is a drive for engaging in certain behaviors or comes on at different time points because of these sex differences. This may shed light on the role sex differences may play in the function of ritual.

Chapter 4 examined how evaluations of conformity to a ritual differs cross-culturally. Contrary to previous research which has shown that U.S. adults were less likely

to endorse high conformity children as intelligent than Ni-Vanuatu adults, Chapter 4 demonstrated that children and adolescents in the U.S. and Vanuatu have a conformity bias when evaluating peers' intelligence and behavior. A potential explanation for these results is the variation in child socialization goals between the U.S., and Vanuatu. U.S. children's and adolescents' endorsement of high-conformity children as intelligent and well behaved reveals a tension between conformity bias and the U.S. emphasis on individuality and creativity. There may be a tension between the messages that children and adolescents are hearing from adults about creativity and how their success in school and other pursuits is determined. Schools may be reinforcing behavioral conformity, as they are imperfect vehicles of cultural values and beliefs. Thus, cultural narratives encouraging creativity and innovation are inconsistent with children's early-developing and heavily reinforced conformity bias.

The data in Chapter 4 demonstrate the importance of theoretically-motivated cultural comparisons. There are very few studies examining conformity across age groups, much less using the same paradigm. This is one of the first cross-cultural studies to examine how an early-developing conformity bias interacts with cultural narratives to impact how children and adolescents reason about others. Future research could examine the role of different kinds of conformity on reasoning about others. For example, conformity to certain beliefs may render different response. Additionally, conformity behavior of different kinds of tasks may differentially influence evaluations. While the results of conformity bias may be the case for learning a necklace making task, it may be different for actions that have different culturally relevant backgrounds. Future studies should also explore these questions in populations (both Western and non-Western) that vary in other aspects of child socialization goals. In addition to variation in exposure to Western-style education, it would be interesting to look at societies that vary in terms of social organization (for

example, hierarcharical social organization in Fiji compared to egalitarian chiefdoms in Vanuatu or egalitarian tribes in hunter-gatherer populations). There is also evidence that cultures vary in many aspects of pedagogical style of facilitating learning in others. It is also important to examine other evaluative traits that may be tied to conformity behavior and to examine different evaluations of children at different ages. Would there be the same expectations for conformity if evaluating videos of adolescents engaging in high or low conformity behavior?

The interdisciplinary and cross-cultural research presented in this dissertation have drawn on mixed methodologies to examine the development of ritual. The findings presented demonstrate that the experience of participating in a ritual increases in-group cohesion in childhood, much earlier than previous research has suggested, which is consistent with what I would expect if the capacity to engage in ritual is a psychologically-prepared, culturally-inherited, behavioral trademark of our species. The findings also support that human psychology is thus geared to motivate individuals to engage in behaviors that increase inclusion within their social groups.

Though this dissertation sheds light on the development of ritual, we still lack a complete picture of the psychological functions of ritual which help to solve the human adaptive problems associated with group living. Future research should investigate how ritual facilitates cooperation with group members by examining how engaging in a ritual might aid in achieving coalitional or cooperative goals. Since affiliation alone does not lead to cooperation, it is important to understand how engaging in ritual changes children's cooperation with in-group members as well as prosociality towards in and out-group members using economic games. This could provide insight into understanding intergroup conflict.

Perhaps certain features of ritual are more likely to drive group cohesion. For example, examining 645 rituals from 74 cultures around the world, Atkinson and Whitehouse (2011) found that the "cultural morphospace" of ritual favors rituals that are either low-frequency and high-arousal or high-frequency and low arousal, and is related to group size and structure. Recent research has found that ritual intensity is related to prosociality toward group members (Xygalatas et al., 2013) and that engaging in a collective fire-walking ritual increases synchronized arousal (heart-rate) between active participates and bystanders. Does the intensity and frequency of the ritual contribute to the function of ritual?

This ties into another future direction of research examining how ritual promotes high fidelity cultural transmission. While we know that children imitate conventional information and will spontaneously imitate if an action is causally opaque (Clegg & Legare, 2016a, 2016b, 2017; Herrmann et al., 2013; Legare et al., 2015; Watson-Jones et al., 2014, 2016), future research could examine the transmission of conventional information between multiple generations. Studies could use transmission chain studies with groups of children to see how they sequentially transmit knowledge to one another in order to examine if ritual in fact allows for more efficient transmission of information between group members. This could additionally facilitate cooperation and cohesion. It would also be interesting to examine if children are able to spontaneously engage in ritual. If you place children in novel social groups, would they spontaneously create collective rituals to promote the longevity of their social group? Observational studies could examine children placed in novel social groups over time to determine what factors play a role in the creation and transmission of collective rituals.

While this work is limited to examining how children engaging in a ritual may lead to increased affiliation with group members, there are many other functions of ritual. It is

important to examine the other functions of ritual and how ritual interacts with social group dynamics. Though this is beyond the scope of this dissertation, future research should examine the motivations behind altering and innovating upon a ritual from generation to generation. Potential factors include a competing group trying to transmit their own cultural information, or an individual who may be trying to break away from the group. Examining the history of religious practices could shed light on when and why rituals are innovated upon.

Finally, it is important to examine these behaviors in culturally diverse environments. Future research should seek to answer these questions in places that vary on dimensions of economic, educational and childrearing factors. Additionally, there could be implications for understanding how rituals could be used in more applied contexts, for instance in examining polarizing social issues.

The research presented in this dissertation help answer the larger question of how children learn to become competent group members. This research has important implications for providing key insight into social group dynamics, helping us to understand the human tendency to prefer in-group members to out-group members. If we can begin to break these questions down, we can understand the processes by which people think and behave in social groups. Beyond the theoretical implications of this research, this work also has the potential to inform our knowledge of intergroup conflict and group interactions in school environments with potential applications to a number of school-related issues, including combatting bullying and prejudice. Understanding social group dynamics is crucially relevant to the current political and social climate that we are experiencing both in our local communities and worldwide.

References

Abrams, D., & Rutland, A. (2008). The development of subjective group dynamics. In S. Levy & M. Killen (Eds.), *Intergroup attitudes and relations in childhood through adulthood* (pp. 47–65). Oxford, UK: Oxford University Press.

Alcorta, C. S., & Sosis, R. (2005). Ritual, emotion, and sacred symbols. *Human Nature*, *16*(4), 323–359. https://doi.org/10.1007/s12110-005-1014-3

Alvarez, J. M., Ruble, D. N., & Bolger, N. (2001). Trait understanding or evaluative reasoning? An analysis of children's behavioral predictions. *Child Development*, *72*(5), 1409–1425. https://doi.org/10.1111/1467-8624.00356

Asch, S. E. E. (1956). Studies of independence and conformity: A minority of one against a majority. *Psychological Monographs*, *70*(9), 1–71. https://doi.org/10.1037/h0093718

Atkinson, Q. D., & Whitehouse, H. (2011). The cultural morphospace of ritual form: Examining modes of religiosity cross-culturally. *Evolution and Human Behavior*, *32*(1), 50–62. https://doi.org/10.1016/j.evolhumbehav.2010.09.002

Azuma, H., & Kashiwagi, K. (1987). Descriptors for an intelligent person: A Japanese study. *Japanese Psychological Research*, *29*(1), 17–26. https://doi.org/1988-23400-001

Berl, R. E. W., & Hewlett, B. S. (2015). Cultural variation in the use of overimitation by the Aka and Ngandu of the Congo Basin. *PLoS ONE*, *10*(3). https://doi.org/10.1371/journal.pone.0120180

Berndt, T. J. (1979). Developmental changes in conformity to peers and parents. *Developmental Psychology*, *15*(6), 608–616. https://doi.org/10.1037/0012-1649.15.6.608

Bernieri, F. J., & Rosenthal, R. (1991). Interpersonal coordination: Behavior matching and interactional synchrony. In *Fundamentals of Nonverbal Behavior: Studies in Emotion & Social Interaction* (pp. 401–432).

Billig, M., & Tafel, H. (1973). Social categorization and similarity in intergroup behavior. *European Journal of Social Psychology* , *3*(1), 27–52. Retrieved from https://doi.org/10.1002/ejsp.2420030103

Bloch, M. (1991). Language, anthropology, and cognitive science. *Man*, *26*(2), 183–198.

Booth, M. Z. (2002). Swazi concepts of intelligence: The universal versus the local.

Ethos, *30*(4), 376–400. https://doi.org/10.1525/eth.2002.30.4.376

Bourgeois, P., & Hess, U. (2008). The impact of social context on mimicry. *Biological Psychology*, *77*(3), 343–352. https://doi.org/10.1016/j.biopsycho.2007.11.008

Boyer, P., & Liénard, P. (2006). Why ritualized behavior? Precaution systems and action parsing in developmental, pathological and cultural rituals. *Behavioral and Brain Sciences*, *29*(6), 595–650. https://doi.org/10.1017/S0140525X06009332

Brewer, M. B. (2007). The importance of being we: Human nature and intergroup relations. *The American Psychologist*, *62*(8), 726–738. https://doi.org/10.1037/0003-066X.62.8.728

Buss, D. M. (1990). The evolution of anxiety and social exclusion. *Journal of Social and Clinical Psychology*, *2*, 196.

Buss, D. M., & Kenrick, D. (1998). Evolutionary social psychology. In *The handbook of social psychology* (4th ed., pp. 982–1026). New York, NY: Oxford University Press.

Buttelmann, D., Zmyj, N., Daum, M., & Carpenter, M. (2013). Selective imitation of in-group over out-group members in 14-month-old infants. *Child Development*, *84*(2), 422–428. https://doi.org/10.1111/j.1467-8624.2012.01860.x

Callaghan, T., Moll, H., Rakoczy, H., Warneken, F., Liszkowski, U., Behne, T., … Tomasello, M. (2011). Early social cognition in three cultural contexts. *Monographs of the Society for Research in Child Development*, *76*(2), 1–142.

Caporael, L. R. (1997). The evolution of truly social cognition: The core configurations model. *Personality and Social Psychology Review*, *1*(4), 276–298.

Chen, E. E., Corriveau, K. H., & Harris, P. L. (2013). Children trust a consensus composed of outgroup members-but do not retain that trust. *Child Development*, *84*(1), 269–282. https://doi.org/10.1111/j.1467-8624.2012.01850.x

Chudek, M., Heller, S., Birch, S., & Henrich, J. (2012). Prestige-biased cultural learning: Bystander's differential attention to potential models influences children's learning. *Evolution and Human Behavior*, *33*(1), 46–56. https://doi.org/10.1016/j.evolhumbehav.2011.05.005

Chudek, M., & Henrich, J. (2011). Culture-gene coevolution, norm-psychology and the emergence of human prosociality. *Trends in Cognitive Sciences*, *15*(5), 218–26. https://doi.org/10.1016/j.tics.2011.03.003

Chudek, M., Zhao, W., & Henrich, J. (2013). Culture-gene coevolution, large-scale cooperation, and the shaping of human social psychology. In *Cooperation and Its*

Evolution (pp. 1–28).

Clegg, J. M., & Legare, C. H. (2016a). A cross-cultural comparison of children's imitative flexibility. *Developmental Psychology*, *52*(9), 1435–1444. https://doi.org/10.1037/dev0000131

Clegg, J. M., & Legare, C. H. (2016b). Instrumental and conventional interpretations of behavior are associated with distinct outcomes in early childhood. *Child Development*, *87*(2), 527–542. https://doi.org/10.1111/cdev.12472

Clegg, J. M., & Legare, C. H. (2017). Parents scaffold flexible imitation during early childhood. *Journal of Experimental Child Psychology*, *153*, 1–14. https://doi.org/10.1016/j.jecp.2016.08.004

Clegg, J. M., Wen, N. J., & Legare, C. H. (2017). Is non-conformity WEIRD? Cultural variation in adults' beliefs about children's competency and conformity. *Journal of Experimental Psychology: General*, *146*(3), 428–441. https://doi.org/http://dx.doi.org/10.1037/xge0000275

Cohen, E., Ejsmond-Frey, R., Knight, N., & Dunbar, R. I. M. (2010). Rowers' high: Behavioural synchrony is correlated with elevated pain thresholds. *Biology Letters*, *6*(1), 106–108. https://doi.org/10.1098/rsbl.2009.0670

Cohen, E., Mundry, R., & Kirschner, S. (2014). Religion, synchrony, and cooperation. *Religion, Brain & Behavior*, *4*(1), 20–30. https://doi.org/10.1080/2153599X.2012.741075

Correa-Chávez, M., & Rogoff, B. (2009). Children's attention to interactions directed to others: Guatemalan Mayan and European American patterns. *Developmental Psychology*, *45*(3), 630–641. https://doi.org/10.1037/a0014144

Corriveau, K. H., DiYanni, C. J., Clegg, J. M., Min, G., Chin, J., & Nasrini, J. (2017). Cultural differences in the imitation and transmission of inefficient actions. *Journal of Experimental Child Psychology*, *161*, 1–18. https://doi.org/10.1016/j.jecp.2017.03.002

Corriveau, K. H., Fusaro, M., & Harris, P. L. (2009). Going with the flow: Preschoolers prefer nondissenters as informants. *Psychological Science*, *20*(3), 372–377. https://doi.org/10.1111/j.1467-9280.2009.02291.x

Corriveau, K. H., Kim, E., Song, G., & Harris, P. L. (2013). Young children's deference to a consensus varies by culture and judgment setting. *Journal of Cognition and Culture*, *13*, 367–381. https://doi.org/10.1163/15685373-12342099

Cosmides, L., & Tooby, J. (2013). Evolutionary psychology: New perspectives on cognition and motivation. *Annual Review of Psychology*, *64*(1), 201–229. https://doi.org/doi:10.1146/annurev.psych.121208.131628

Dadkah, A., Harizuka, S., & Mandal, M. K. (1999). Pattern of social interaction in societies of the Asia-Pacific region. *Journal of Social Psychology*, *139*(6), 730–735. https://doi.org/10.1080/00224549909598252

Diehl, M. (1990). The minimal group paradigm: Theoretical explanations and empirical findings. *European Review of Social Psychology*, *1*(1), 263–292. https://doi.org/10.1080/14792779108401864

Diesendruck, G. (2005). The principles of conventionality and contrast in word learning: An empirical examination. *Developmental Psychology*, *41*(3), 451–463. https://doi.org/10.1037/0012-1649.41.3.451

Diesendruck, G., Goldfein-Elbaz, R., Rhodes, M., Gelman, S., & Neumark, N. (2013). Cross-Cultural Differences in Children's Beliefs About the Objectivity of Social Categories. *Child Development*, *84*(6), 1906–1917. https://doi.org/10.1111/cdev.12108

Diesendruck, G., & Markson, L. (2011). Children's assumption of the conventionality of culture. *Child Development Perspectives*, *5*(3), 189–195. https://doi.org/10.1111/j.1750-8606.2010.00156.x

Dunham, Y., Baron, A. S., & Banaji, M. R. (2008). The development of implicit intergroup cognition. *Trends in Cognitive Sciences*, *12*(7), 248–253. https://doi.org/10.1016/j.tics.2008.04.006

Dunham, Y., Baron, A. S., & Carey, S. (2011). Consequences of "minimal" group affiliations in children. *Child Development*, *82*(3), 793–811. https://doi.org/10.1111/j.1467-8624.2011.01577.x

Durkheim, E. (1915). *The elementary forms of religious life*. London, England: Allen and Unwin.

Ennett, S. T., Bauman, K. E., Hussong, A., Faris, R., Foshee, V. A., Cai, L., & DuRant, R. H. (2006). The peer context of adolescent substance use: Findings from social network analysis. *Journal of Research on Adolescence*, *16*(2), 159–186. https://doi.org/10.1111/j.1532-7795.2006.00127.x

Flynn, E., & Whiten, A. (2008). Cultural transmission of tool use in young children: A diffusion chain study. *Social Development*. https://doi.org/10.1111/j.1467-9507.2007.00453.x

Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: An experimental study. *Developmental Psychology*, *41*(4), 625–635. https://doi.org/10.1037/a0026993

Gelman, S. A., Heyman, G. D., & Legare, C. H. (2007). Developmental changes in the coherence of essentialist beliefs about psychological characteristics. *Child Development*, *78*(3), 757–774. https://doi.org/10.1111/j.1467-8624.2007.01031.x

Gluckman, M. (1954). *Rituals of rebellion in South-East Africa*. Manchester University Press.

Gómez, Á., Brooks, M. L., Buhrmester, M. D., Vázquez, A., Jetten, J., & Swann Jr., W. B. (2011). On the nature of identity fusion: Insights into the construct and a new measure. *Journal of Personality and Social Psychology*, *100*(5), 918–933. https://doi.org/http://dx.doi.org/10.1037/a0022642

Greenberger, E. (1982). Education and the acquisition of psychosocial maturity. In D. McClelland (Ed.), *The development of social maturity* (pp. 155–189). New York: Irvington Publishers.

Harkness, S., Blom, M., Oliva, A., Moscardino, U., Zylicz, P. O., Bermudez, M. R., … Super, C. M. (2007). Teachers' ethnotheories of the "ideal student" in five western cultures. *Comparative Education*, *43*(1), 113–135. https://doi.org/10.1080/03050060601162438

Harkness, S., & Super, C. M. (1992). Parental ethnotheories in action. In I. Sigel, A. V. McGillicuddy-DeLisi, & J. Goodnow (Eds.), *Parental belief systems: The psychological consequences for children* (2nd ed., pp. 373–392). Hillsdale, NJ: Lawrence Erlbaum Associates.

Harris, P. L. (2007). Trust. *Developmental Science*, *10*, 135–138.

Harris, P. L., & Corriveau, K. H. (2011). Young children's selective trust in informants. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *366*(1567), 1179–1187. https://doi.org/10.1098/rstb.2010.0321

Haun, D. B. M., Rekers, Y., & Tomasello, M. (2014). Children conform to the behavior of peers; Other great apes stick with what they know. *Psychological Science*, *25*(12), 2160–2167. https://doi.org/10.1177/0956797614553235

Haun, D. B. M., & Tomasello, M. (2011). Conformity to peer pressure in preschool children. *Child Development*, *82*(6), 1759–1767. https://doi.org/10.1111/j.1467-8624.2011.01666.x

Henrich, J. (2009). The evolution of costly displays, cooperation and religion: Credibility enhancing displays and their implications for cultural evolution. *Evolution and Human Behavior*, *30*, 244–260. https://doi.org/10.1016/j.evolhumbehav.2009.03.005

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Beyond WEIRD: Towards a broad-based behavioral science. *Behavioral and Brain Sciences*, *33*(2–3), 111–135. https://doi.org/10.1017/S0140525x10000725

Herrmann, P. A., Legare, C. H., Harris, P. L., & Whitehouse, H. (2013). Stick to the script: the effect of witnessing multiple actors on children's imitation. *Cognition*, *129*(3), 536–543. https://doi.org/10.1016/j.cognition.2013.08.010

Heyes, C. M., & Frith, C. D. (2014). The cultural evolution of mind reading. *Science*, *344*(6190), 1243091. https://doi.org/10.1126/science.1243091

Heyman, G. D., Gee, C. L., & Giles, J. W. (2003). Preschool children's reasoning about ability. *Child Development*, *74*(2), 516–534. https://doi.org/10.1111/1467-8624.7402013

Heyman, G. D., & Giles, J. W. (2004). Valence effects in reasoning about evaluative traits. *Merrill-Palmer Quarterly*, *50*(1), 86–109.

Heyman, G. D., & Legare, C. H. (2005). Children's evaluation of sources of information about traits. *Developmental Psychology*, *41*(4), 636–647. https://doi.org/10.1037/0012-1649.41.4.636

Hirschfeld, L. A. (1996). *Race in the making: Cognition, culture, and the child's construction of human minds*. *Cambridge, MA: MIT Press*. Cambridge: MIT Press.

Hove, M. J., & Risen, J. L. (2009). It's all in the timing: Interpersonal synchrony increases affiliation. *Social Cognition*, *27*(6), 949–960. https://doi.org/10.1521/soco.2009.27.6.949

Humphrey, C., & Laidlaw, J. (1994). The archetypal actions of ritual: A theory of ritual. In *Oxford studies in social and cultural anthropology*. Oxford: Clarendon Press.

Jensen, L. A. (2012). Bridging universal and cultural perspectives: A vision for developmental psychology in a global world. *Child Development Perspectives*, *6*(1), 98–104. https://doi.org/10.1111/j.1750-8606.2011.00213.x

Kalish, C. W. (2005). Becoming status conscious: Children's appreciation of social reality. *Philosophical Explorations*, *8*(3), 245–263. https://doi.org/10.1080/07418820500219359

Kalish, C. W. (2013). Status seeking: The importance of roles in early social cognition. In

M. R. Banaji & S. A. Gelman (Eds.). In *Navigating the Social World* (pp. 216–219). New York, NY: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199890712.003.0039

Keller, H., & Kärtner, J. (2013). The cultural solution of universal developmental tasks. *Advances in Culture and Psychology*, *3*, 63–116.

Kenward, B., Karlsson, M., & Persson, J. (2011). Over-imitation is better explained by norm learning than by distorted causal learning. *Proceedings of the Royal Society B*, *278*(1709), 1239–46. https://doi.org/10.1098/rspb.2010.1399

Killen, M., & Rutland, A. (2011). *Children and social exclusion: Morality, prejudice, and group identity*. Malden, MA: John Wiley & Sons.

Kim, M. S. (1994). Cross cultural comparisons of the perceived importance of conversational constraints. *Human Communication Research*, *21*(1), 128–151. https://doi.org/10.1111/j.1468-2958.1994.tb00343.x

Kinzler, K. D., Dupoux, E., & Spelke, E. S. (2007). The native language of social cognition. *Proceedings of the National Academy of Sciences*, *104*(30), 12577–80. https://doi.org/10.1073/pnas.0705345104

Kirschner, S., & Tomasello, M. (2010). Joint music making promotes prosocial behavior in 4-year-old children. *Evolution and Human Behavior*, *31*, 354–364. https://doi.org/10.1016/j.evolhumbehav.2010.04.004

Konvalinka, I., Xygalatas, D., Bulbulia, J., Schjødt, U., Jegindø, E.-M., Wallot, S., … Riitta Hari, by. (2011). Synchronized arousal between performers and related spectators in a fire-walking ritual. *Proceedings of the National Academy of Sciences*, *108*(20), 8514–8519. https://doi.org/10.1073/pnas.1016955108

Kun, A. (1977). Development of the magnitude-covariation and compensation schemata in ability and effort attributions of performance. *Child Development*, *48*(3), 862. https://doi.org/10.2307/1128335

Kurzban, R., & Neuberg, S. (2005). Managing ingroup and outgroup relationships. In D. M. Buss (Ed.), *The Handbook of Evolutionary Psychology* (pp. 653–675). New York: Wiley.

Lakin, J. L., Chartrand, T. L., & Arkin, R. M. (2008). I am too just like you: Nonconscious mimicry as an automatic behavioral response to social exclusion. *Psychological Science*, *19*(8), 816–822.

Lancy, D. F. (2010). Learning "from nobody": The limited role of teaching in folk

models of children's development. *Childhood in the Past*, *3*(1), 79–106. https://doi.org/10.1037/e643262011-001

Lawton, J. T., Schuler, S. G., Fowell, N., & Madsen, M. K. (1984). Parents' perceptions of actual and ideal child-rearing practices. *The Journal of Genetic Psychology: Research and Theory on Human Development*, *145*(1), 77–87. https://doi.org/10.1080/00221325.1984.10532252

Legare, C. H. (2017). Cumulative cultural learning: Development and diversity. *Proceedings of the National Academy of Sciences*, *114*(30), 7877–7883. https://doi.org/10.1073/pnas.1620743114

Legare, C. H., & Herrmann, P. A. (2013). Cognitive consequences and constraints on reasoning about ritual. *World Journal of Biological Psychiatry Acta Psychiatrica Scandinavica*, *10*(180), 480–487.

Legare, C. H., & Nielsen, M. (2015). Imitation and innovation: The dual engines of cultural learning. *Trends in Cognitive Sciences*, *19*, 688–699. https://doi.org/10.1016/j.tics.2015.08.005

Legare, C. H., & Souza, A. L. (2012). Evaluating ritual efficacy: Evidence from the supernatural. *Cognition*, *124*(1), 1–15. https://doi.org/10.1016/j.cognition.2012.03.004

Legare, C. H., & Souza, A. L. (2014). Searching for control: Priming randomness increases the evaluation of ritual efficacy. *Cognitive Science*, *38*(1), 152–161. https://doi.org/10.1111/cogs.12077

Legare, C. H., & Watson-Jones, R. E. (2015). The evolution and ontogeny of ritual. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 829–847). Hoboken, NJ: Wiley & Sons.

Legare, C. H., & Wen, N. J. (2014). The Effects of Ritual on the Development of Social Group Cognition. *The International Society for the Study of Behavioural Development Bulletin*, *66*(2), 9–12.

Legare, C. H., Wen, N. J., Herrmann, P. A., & Whitehouse, H. (2015). Imitative flexibility and the development of cultural learning. *Cognition*, *142*, 351–361. https://doi.org/10.1016/j.cognition.2015.05.020

Little, E. E., Carver, L. J., & Legare, C. H. (2016). Cultural variation in triadic infant–caregiver object exploration. *Child Development*, *87*(4), 1130–1145. https://doi.org/10.1111/cdev.12513

Lutz, C. (1985). Ethnopsychology compared to what? Explaining behavior and consciousness among the Ifaluk. In G. M. White & J. Kirkpatrick (Eds.), *Person, Self, and Experience: Exploring Pacific Ethnopsychologies* (pp. 35–79). Berkeley, CA: University of Californica Press.

Maccoby, E. E., & Martin, J. A. (1983). Socialization in the context of the family: Parent–child interaction. In P. H. Mussen & E. M. Hetherington (Eds.), *Handbook of child psychology: Socialization, personality, and social development* (4th ed., pp. 1–101). New York, NY: Wiley.

Marsh, K. L., Richardson, M. J., & Schmidt, R. C. (2009). Social connection through joint action and interpersonal coordination. *Topics in Cognitive Science*, *1*(2), 320–339. https://doi.org/10.1111/j.1756-8765.2009.01022.x

Mathew, S. (2015). Are cultural and evolutionary views of human warfare converging? A review of war, peace, and human nature. *Cliodynamics: The Journal of Quantitative History and Cultural Evolution*, *6 (1)*.

McElreath, R., Boyd, R., & Richerson, P. J. (2003). Shared norms can lead to the evolution of ethnic markers. *Current Anthropology*, *44*, 122–130.

McGillicuddy-De Lisi, A. V., & Subramanian, S. (1996). How do children develop knowledge? Beliefs of Tanzanian and American mothers. In S. Harkness & C. M. Super (Eds.), *Culture and human development* (pp. 143–168). New York, NY: Guilford.

Nesdale, D., & Flesser, D. (2001). Social identity and the development of children's group attitudes. *Child Development*, *72*(2), 506–517. https://doi.org/10.1111/1467-8624.00293

Nicholls, J. G., & Miller, A. T. (1984). Reasoning about the ability of self and others: A developmental study. *Child Development*, *55*, 1990–1999.

Nielsen, M. (2006). Copying actions and copying outcomes: Social learning through the second year. *Developmental Psychology*, *42*(3), 555–565. https://doi.org/10.1037/0012-1649.42.3.555

Nielsen, M., & Blank, C. (2011). Imitation in young children: When who gets copied is more important than what get copied. *Developmental Psychology*, *47*(4), 1050–1053. https://doi.org/10.1037/a0023866

Nielsen, M., Haun, D. B. M., Kaertner, J., & Legare, C. H. (2017). The persistent sampling bias in developmental psychology: A call to action. *Journal of Experimental Child Psychology*, *162*, 32–38.

Nielsen, M., Kapitány, R., & Elkins, R. (2015). The perpetuation of ritualistic actions as revealed by young children's transmission of normative behavior. *Evolution and Human Behavior*, *36*(3), 191–198. https://doi.org/10.1016/j.evolhumbehav.2014.11.002

Nielsen, M., Mushin, I., Tomaselli, K., & Whiten, A. (2014). Where culture takes hold: "Overimitation" and its flexible deployment in Western, Aboriginal, and Bushmen children. *Child Development*. https://doi.org/10.1111/cdev.12265

Nielsen, M., & Tomaselli, K. (2010). Overimitation in Kalahari Bushman children and the origins of human cultural cognition. *Psychological Science*, *21*(5), 729–736. https://doi.org/10.1177/0956797610368808

Norton, M. I., & Gino, F. (2014). Rituals alleviate grieving for loved ones, lovers, and lotteries. *Journal of Experimental Psychology: General*, *143*(1), 266–72. https://doi.org/10.1037/a0031772

Over, H., & Carpenter, M. (2009). Priming third-party ostracism increases affiliative imitation in children. *Developmental Science*, *12*(3), F1–F8. https://doi.org/10.1111/j.1467-7687.2008.00820.x

Over, H., & Carpenter, M. (2012). Putting the social into social learning: Explaining both selectivity and fidelity in children's copying behavior. *Journal of Comparative Psychology*, *126*(2), 182. https://doi.org/10.1037/a0024555

Pasquini, E. S., Corriveau, K. H., Koenig, M., & Harris, P. L. (2007). Preschoolers monitor the relative accuracy of informants. *Developmental Psychology*, *43*(5), 1216–1226. https://doi.org/10.1037/0012-1649.43.5.1216

Peck, J. G., & Gregory, R. J. (2005). A brief overview of the old new Hebrides. *Anthropologist*, *7*(4), 269–282.

Poole, F. J. P. (1985). *Coming into social being: Cultural images of infants in Bimin–Kuskusmin folk psychology*. Berkeley, CA: University of California Press.

Powell, L. J., & Spelke, E. S. (2013). Preverbal infants expect members of social groups to act alike. *Proceedings of the National Academy of Sciences*. https://doi.org/10.1073/pnas.1304326110

Raina, M. K. (1975). Parental perception about ideal child: A cross-cultural study. *Journal of Marriage and Family*, *37*(1), 229–232. https://doi.org/10.2307/351047

Rakoczy, H., Warneken, F., & Tomasello, M. (2008). The sources of normativity: Young children's awareness of the normative structure of games. *Developmental*

Psychology, *44*(3), 875–881. https://doi.org/10.1037/0012-1649.44.3.875

Rappaport, R. (1999). *Ritual and religion in the making of humanity*. Cambridge: Cambridge University Press.

Raval, V. V, Raval, P. H., & Deo, N. (2014). Mothers' socialization goals, mothers' emotion socialization behaviors, child emotion regulation, and child socioemotional functioning in urban India. *Journal of Early Adolescence*, *34*(2), 229–250. https://doi.org/10.1177/0272431613485821

Reddish, P., Bulbulia, J., & Fischer, R. (2013). Does synchrony promote generalized prosociality? *Religion, Brain, and Behavior*. https://doi.org/10.1080/2153599X.2013.764545

Reddish, P., Fischer, R., Bulbulia, J., & Szolnoki, A. (2013). Let's dance together: Synchrony, shared intentionality and cooperation. *PLoS ONE*, *8*(8). https://doi.org/10.1371/

Rhodes, M. (2012). Naïve theories of social groups. *Child Development*, *83*(6), 1900–1916. https://doi.org/10.1111/j.1467-8624.2012.01835.x

Richerson, P. J., & Boyd, R. T. (2005). *Not by genes alone: How culture transformed human evolution*. Chicago, IL: The University of Chicago Press.

Richerson, P. J., Boyd, R. T., & Henrich, J. (2003). *The Cultural evolution of human cooperation*. Cambridge: MIT Press.

Rossano, M. J. (2012). The essential role of ritual in the transmission and reinforcement of social norms. *Psychological Bulletin*, *138*(3), 5. https://doi.org/10.1037/a0027038

Ruffle, B. J., & Sosis, R. (2007). Does it pay to pray? Costly ritual and cooperation. *The B.E. Journal of Economic Analysis & Policy*, *7*(1), 1–35.

Schmidt, M. F. H., & Tomasello, M. (2012). Young children enforce social norms. *Current Directions in Psychological Science*, *21*(4), 232–236. https://doi.org/10.1177/0963721412448659

Serpell, R. (1993). *The significance of schooling: Life-journeys in an African society*. Cambridge, U.K.: Cambridge University Press.

Serpell, R. (2011). Social responsibility as a dimension of intelligence, and as an educational goal: Insights from programmatic research in an African society. *Child Development Perspectives*, *5*(2), 126–133. https://doi.org/10.1111/j.1750-8606.2011.00167.x

Smetana, J. G. (2006). Social-cognitive domain theory: Consistencies and variations in children's moral and social judgments. In M. Killen & J. G. Smetana (Ed.), *Handbook of moral development* (pp. 119–154). Mahwah: Lawrence Erlbaum Associates.

Soler, M. (2012). Costly signaling, ritual and cooperation: Evidence from Candombl, an Afro-Brazilian religion. *Evolution and Human Behavior*, *33*, 346–356. https://doi.org/10.1016/j.evolhumbehav.2011.11.004

Sørensen, J. (2007). Acts that work: A cognitive approach to ritual agency, *19*, 281–300. https://doi.org/10.1163/157006807X240118

Sosis, R., & Alcorta, C. (2003). Signaling, solidarity, and the sacred: the evolution of religious behavior. *Evolutionary Anthropology*, *12*, 264–274. https://doi.org/10.1002/evan.10120

Sosis, R., & Bressler, E. R. (2003). Cooperation and commune longevity: A test of the costly signaling theory of religion. *Cross-Cultural Research*, *37*(2), 211–239. https://doi.org/10.1177/1069397103251426

Sosis, R., & Ruffle, B. J. (2003). Religious ritual and cooperation: Testing for a relationship on Israeli religious and secular Kibbutzim. *Current Anthropology*, *44*(5), 713–722. https://doi.org/10.1086/379260

Steinberg, L. (1990). Autonomy, conflict, and harmony in the family relationship. In S. Feldman & G. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 255–276). Cambridge, MA: Harvard University Press.

Steinberg, L., & Cauffman, E. (1996). Maturity of judgment in adolescence: Psychosocial factors in adolescent decision making. *Law and Human Behavior*, *20*(3), 249–272. https://doi.org/http://dx.doi.org/10.1007/BF01499023

Sternberg, R. J., & Grigorenko, E. L. (2004). Intelligence and culture: How culture shapes what intelligence means, and the implications for a science of well-being. *Philosophical Transactions of the Royal Society B*, *359*, 1427–1434. https://doi.org/doi:10.1098/rstb.2004.1514

Strachan, J., Samuel, J., & Takaro, M. (2007). Ni Vanuatu women graduates: What happens when they go home? *Development in Practice*, *17*(1), 147–153. https://doi.org/10.2307/25548187

Suizzo, M.-A. (2007). Parents' goals and values for children dimensions of independence and interdependence across four U.S. ethnic groups. *Journal of Cross-Cultural Psychology*, *38*(4), 506–530. https://doi.org/10.1177/0022022107302365

Swann, W. B., Gómez, Á., Seyle, D. C., Morales, J. F., & Huici, C. (2009). Identity fusion: The interplay of personal and social identities in extreme group behavior. *Journal of Personality and Social Psychology*, *96*(5), 995–1011. https://doi.org/10.1037/a0013668

Swann, W. B., Jetten, J., Whitehouse, H., Bastian, B., Gómez, Á., Whitehouse, H., … Swann, C. (2012). When group membership gets personal: A theory of identity fusion. *Psychological Review*, *119*(3), 441–456. https://doi.org/10.1037/a0028589

Tajfel, H. (1970). Experiments in intergroup discrimination. *Scientific American*, *223*(5), 96–102.

Tajfel, H., Billig, M. G., & Bundy, R. P. (1971). Social catgorization and intergroup behavior. *European Journal of Social Psychology*, *1*(1), 27–52. https://doi.org/10.1002/ejsp.2420030103

Tajfel, H., & Turner, J. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Ed.), *The social psychology of intergroup relations* (pp. 33–47). Monterey, CA: Brooks-Cole.

Tobin, J. J., Hsueh, Y., & Karasawa, M. (2009). *Preschool in three cultures revisited: China, Japan, and the United States*. Chicago, IL: University of Chicago Press.

Tomasello, M., Carpenter, M., Call, J., Behne, T., & Moll, H. (2005). Understanding and sharing intentions: The origins of cultural cognition. *Behavioral and Brain Sciences*, *28*(5), 675–735. https://doi.org/10.1017/S0140525X05000129

Tomasello, M., Kruger, A. C., & Ratner, H. H. (1993). Cultural learning. *Behavioral and Brain Sciences*, *16*, 495–552.

Tooby, J., Cosmides, L., & Price, M. E. (2006). Cognitive adaptations for n-person exchange: The evolutionary roots of organizational behavior. *Managerial and Decision Economics*, *27*. https://doi.org/10.1002/mde.1287

Turiel, E. (1998). The development of morality. In W. Damon & N. Eisenberg (Eds.), *Handbook of Child Psychology: Social, Emotional, and Personality Development* (5th ed., pp. 863–932). New York: Wiley. https://doi.org/DOI: 10.1002/9780470147658.chpsy0313

Turner, V. (1969). *The ritual process: Structure and anti-structure*. Piscatawa: Transaction Publishers.

UNICEF. (2013). *Vanuatu statistics*. Retrieved from https://www.unicef.org/infobycountry/vanuatu_statistics.html

Vohs, K. D., Wang, Y., Gino, F., & Norton, M. I. (2013). Rituals enhance consumption. *Psychological Science*, *24*(9), 1714–1721. https://doi.org/10.1177/0956797613478949

Walker, M. B., & Andrade, M. G. (1996). Conformity in the Asch task as a function of age. *The Journal of Social Psychology*, *136*(3), 367–372. https://doi.org/10.1080/00224545.1996.9714014

Walker, P. O. (2013). Storians: Building on indigenous knowledge to enhance Ni-Vanuatu mediative capacity. *Conflict Resolution Quarterly*, *30*(3), 309–328. https://doi.org/10.1002/crq.21065

Watson-Jones, R. E., & Legare, C. H. (2016). The social functions of group rituals. *Current Directions in Psychological Science*, *25*(1), 42–46. https://doi.org/10.1177/0963721415618486

Watson-Jones, R. E., Legare, C. H., Whitehouse, H., & Clegg, J. M. (2014). Task-specific effects of ostracism on imitative fidelity in early childhood. *Evolution and Human Behavior*, *35*(3), 204–210. https://doi.org/10.1016/j.evolhumbehav.2014.01.004

Watson-Jones, R. E., Whitehouse, H., & Legare, C. H. (2016). In-group ostracism increases high-fidelity imitation in early childhood. *Psychological Science*, *27*(1), 34–42. https://doi.org/10.1177/0956797615607205

Wen, N. J., Clegg, J. M., & Legare, C. H. (2017). Smart conformists: Children and adolescents associate conformity with intelligence across cultures. *Child Development*. https://doi.org/10.1111/cdev.12935

Wen, N. J., Herrmann, P. A., & Legare, C. H. (2016). Ritual increases children's affiliation with in-group members. *Evolution and Human Behavior*, *37*, 54–60. https://doi.org/10.1016/j.evolhumbehav.2015.08.002

Wen, N. J., Willard, A. K., Caughy, M., & Legare, C. H. (n.d.). Examining ritual and children's social group dynamics.

White, G. M. (1985). Premises and purposes in a Solomon Islands ethnopsychology. In G. M. White & J. Kirkpatrick (Eds.), *Person, self, and experience: Exploring Pacific ethnopsychologies* (pp. 328–366). Berkeley, CA: University of California Press.

Whitehouse, H. (2004). *Modes of religiosity: A cognitive theory of religious transmission*. Walnut Creek, CA: AltaMira Press.

Whitehouse, H., & Lanman, J. A. (2014). The ties that bind us: Ritual, fusion, and

identification. *Current Anthropology*, *55*(6), 674–695. https://doi.org/10.1086/678698

Whitehouse, H., McQuinn, B., Buhrmester, M., & Swann, W. B. (2014). Brothers in arms: Libyan revolutionaries bond like family: Fig. 1. *Proceedings of the National Academy of Sciences*, *111*(50), 17783–17785. https://doi.org/10.1073/pnas.1416284111

Whiten, A., McGuigan, N., Marshall-Pescini, S., & Hopper, L. M. (2009). Emulation, imitation, over-imitation and the scope of culture for child and chimpanzee. *Philosophical Transaction of the Royal Society B*, *364*, 2417–2428. https://doi.org/10.1098/rstb.2009.0069

Wilks, M., Collier-Baker, E., & Nielsen, M. (2015). Preschool children favor copying a successful individual over an unsuccessful group. *Developmental Science*, *18*(6), 1014–1024. https://doi.org/10.1111/desc.12274

Williams, K. D., & Nida, S. A. (2011). Ostracism: Consequences and coping. *Current Directions in Psychological Science*, *20*(2), 71–75. https://doi.org/10.1177/0963721411402480

Wiltermuth, S. S., & Heath, C. (2009). Synchrony and cooperation. *Psychological Science*, *20*(1), 1–5. https://doi.org/10.1111/j.1467-9280.2008.02253.x

Xygalatas, D., Mitkidis, P., Fischer, R., Reddish, P., Skewes, J., Geertz, A. W., … Bulbulia, J. (2013). Extreme rituals promote prosociality. *Psychological Science*, *24*(8), 1602–1605. https://doi.org/10.1177/0956797612472910